

SERVICE MANUAL

**AMIGA COMPUTER
MODEL 1000**
Preliminary
COMPONENT LEVEL REPAIR
PN 314038-02



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PN 314038-02**

Commodore-Amiga, Inc.

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OVERVIEW

The AMIGA computer is a high-performance system with advanced graphics and audio features. The Functional Block Diagram on page 4 illustrates the relationship of the various circuits on the Main Logic board and Piggyback. The principle hardware features consist of the 68000 microprocessor which runs at 7.2 MHz, 256K bytes of RAM (user expandable to 512K, configurable to 8M), 2 parallel I/O chips and 3 custom VLSI chips that provide the unique capabilities for animation, graphics and sound.

68000 MICROPROCESSOR

The 68000 is the CPU of the system. All other resources are under software control via control data issued from it. All 3 custom chips have control registers that are written by the 68000.

The 68000 communicates with the rest of the computer via its address bus, data bus and control lines. Notice that in the block diagram the 3 custom chips do not reside directly on the 68000 buses. When the 68000 starts a bus cycle that is intended for the custom chips or the display RAM, the bus control logic detects whether or not the display RAM buses are available. The bus control logic will not assert the acknowledge signal (/DTACK) back to the 68000 until the display RAM buses are available. Once the 68000 receives /DTACK it completes the bus cycle. Connecting the display RAM buses to the 68000 buses is discussed further in the section on bus control and multiplexers. Because the display RAM is capable of approximately twice the bandwidth of the 68000, the 68000 is usually not delayed by waiting for the display buses to become available.

The 68000 can fetch instructions from:

- Boot ROM
- Processor RAM
- Display RAM

The 68000 can read and write data directly to:

- Boot ROM (Read Only)
- Processor RAM (After boot this is Read Only)
- Display RAM
- Parallel I/O Chips
- 3 Custom I.C.s

The 68000 transmits data and control to and from the peripherals via the parallel I/O and the 3 custom chips.

7M is the processor clock to the 68000. C1-C4 and /DAC are used to clock the custom chips and for determining the timing of signals to the memory arrays.

BOOT ROM

The boot ROM is comprised of 2 standard 32K byte ROMS configured in parallel to form a 32K word that includes the routines for bringing in additional code from the floppy disk.

PROCESSOR RAM

This 256K byte RAM is intended to hold kernal and DOS routines. It has associated logic which allows it to be write protected once it has been loaded. This allows it to function as ROM once the boot load has been completed. Except during the boot sequence, "writes" to this RAM are prevented.

This RAM and its associated buffers and logic are resident on the piggyback board (daughter card), which is attached to the main board.

PARALLEL I/O

The 2 multi-purpose 8520 I/O chips provide the following:

- I/O to and from the parallel port connector
- Control lines to and from the joystick/mouse ports
- A control line to the front panel LED
- Internal control lines
- Keyboard control lines, clock and data
- Serial port control lines
- Floppy disk interface control lines
- Internal timers

These 2 chips reside on the 68000 buses and are read and written by the 68000.

CLOCKS GENERATOR

The entire computer board is run synchronous to the 3.579545 MHz color clock. This is accomplished by generating a number of submultiple frequencies from the master 28.31818 MHz crystal oscillator. In order to reduce high frequency radiation, all clock generation is done in the small metal RF can on the main logic board. The following are the primary clocks:

C1	3.579545 MHz color clock
C2	C1 shifted 45 degrees later
C3	C2 shifted 45 degrees later
C4	C3 shifted 45 degrees later
7M	C1 XORed with C3 = 7.15909 MHz
/DAC	7M shifted 90 degrees later

THE 3 CUSTOM CHIPS

The 3 custom chips provide very fast manipulation of graphics and audio data in the display RAM. All of the major functions in the chips are DMA driven; that is, streams of data are moved between the custom chips and display RAM under DMA control. These streams of data are acted upon by the custom chips. Agnus, custom chip #1, contains 25 dedicated purpose DMA counters.

The 3 chips have control registers which are usually loaded by the 68000. However, Agnus also has the capability of loading control registers in the other 2 custom chips. When Agnus performs a bus cycle, it outputs a code on the Register Address Bus telling the other 2 chips the nature of the bus cycle. This is necessary because many of the bus cycles provide data to or from the other 2 chips, thus they must cooperate appropriately.

In addition to manipulating data in the display RAM, the custom chips output streams of data to the video output circuits, audio output circuits and move data to and from the floppy disks and serial port.

Note that the display RAM buses can be completely isolated from the 68000 buses by the multiplexers and drivers. Thus, Agnus can be performing a bus cycle on the display buses simultaneously with the 68000 performing a bus cycle on its buses. This parallelism increases throughput.

BUS CONTROL, ADDRESS/DATA MUX, ADDRESS DRIVER

The bus control logic resides primarily in 4 PALs on the piggyback board. They provide the logic for connecting the 68000 buses to the display RAM buses when the 68000 is attempting to access the display RAM or the custom chips. To do this, the bus control logic must perform 3 major functions:

- Synchronize the 68000 to the current phase of C1
- Arbitrate between the 68000 and Agnus for the display buses
- Turn on the muxes and bus drivers appropriate to the current cycle

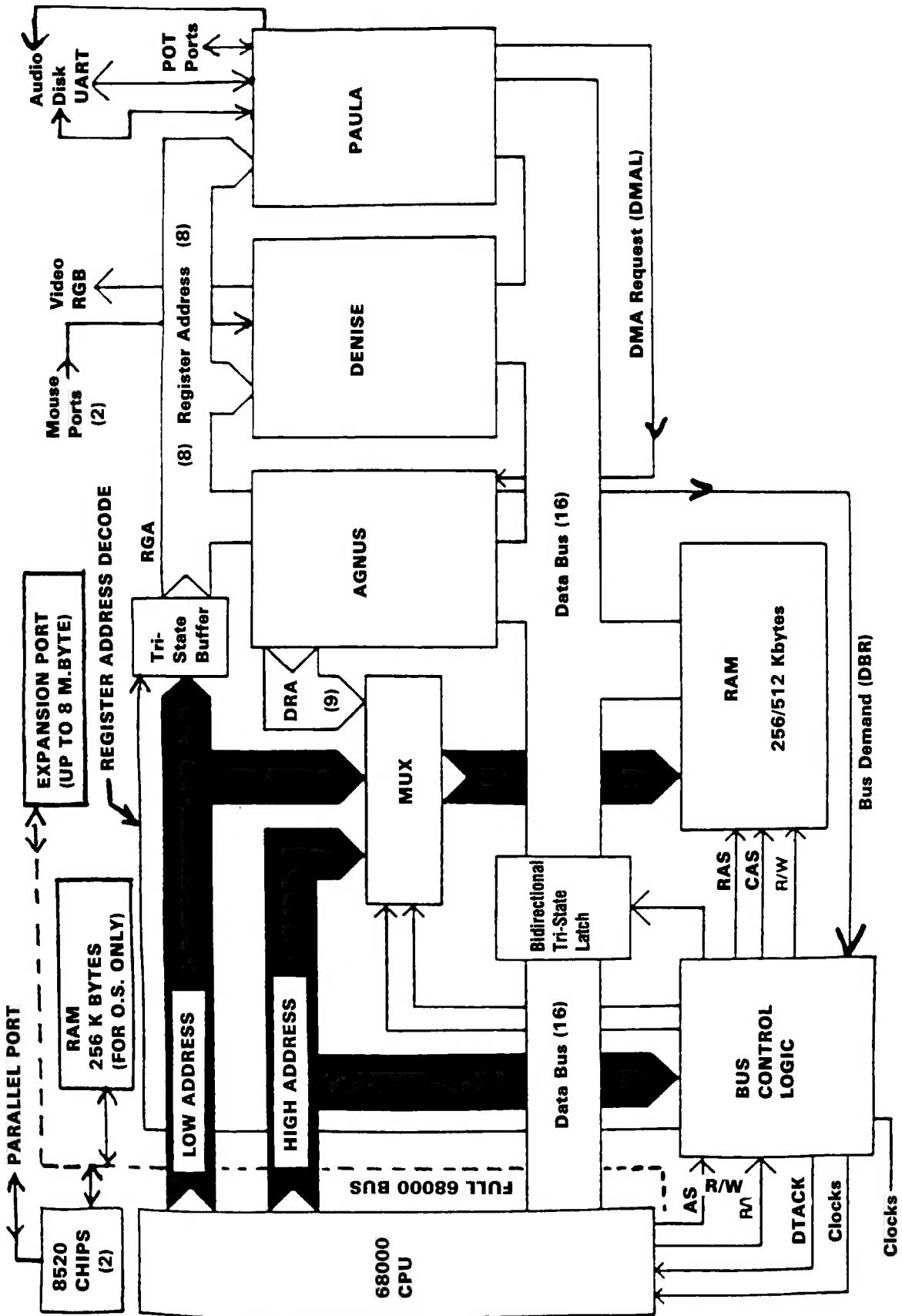
Synchronizing the 68000 to C1 is straightforward, since the 68000 is clocked by 7M which is twice the frequency and synchronous to C1. If the 68000 starts a bus cycle in the wrong phase of C1, the bus control logic merely delays /DTACK long enough so that the 68000 will complete the bus cycle in the desired phase relationship to C1. This phase relationship is necessary because the custom chips and the display RAM are clocked by C1.

Arbitration is very simple. Agnus tells the bus control prior to taking the display RAM buses by asserting an input to the PALs called /DBR. Whenever Agnus has the display buses and the 68000 wants them, the 68000 is held off by not giving it /DTACK. In this state the 68000 has no affect on the display buses until the bus controller enables the bus drivers and multiplexers, after Agnus has given up the display buses.

DISPLAY RAM

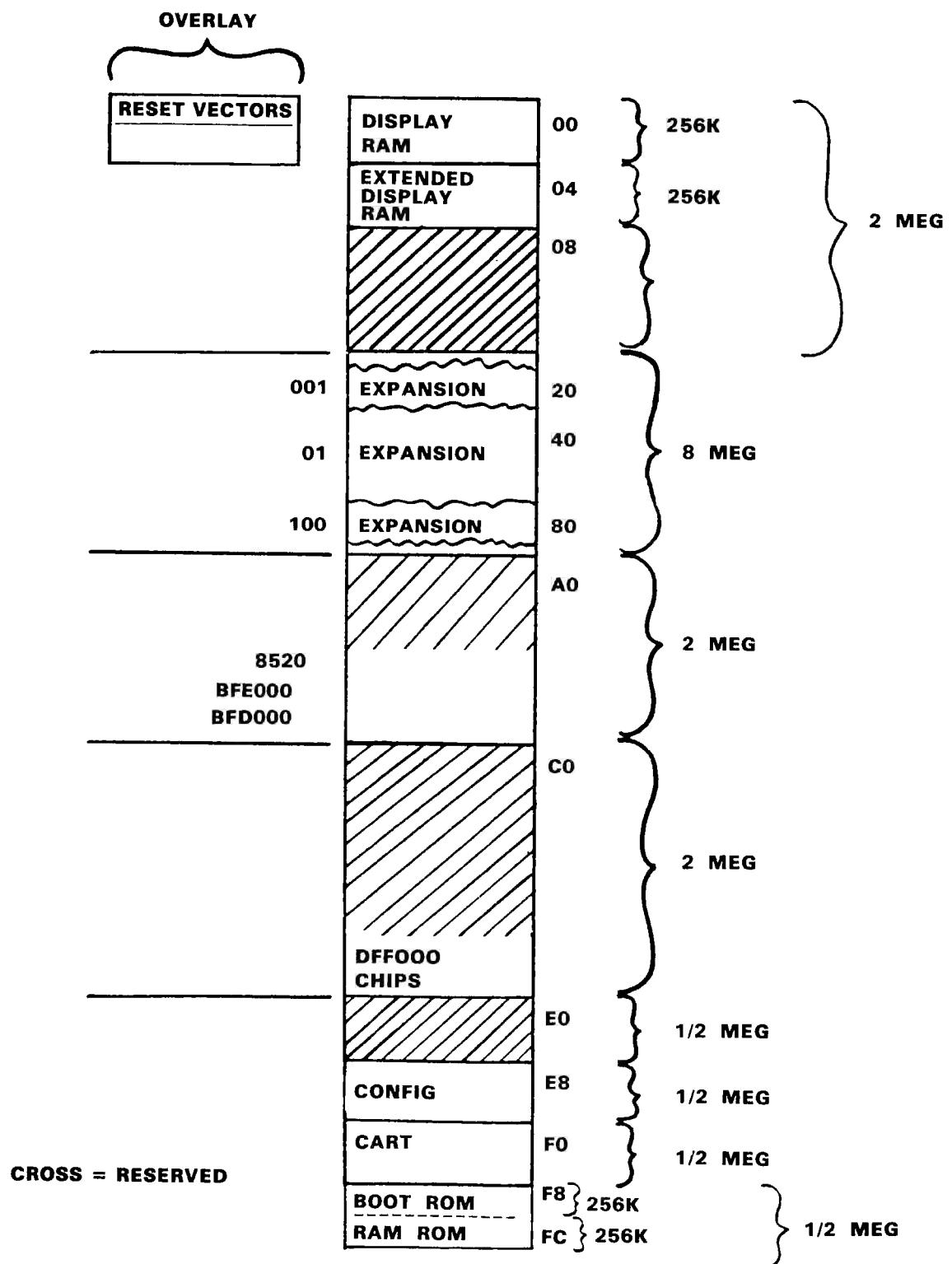
The display RAM is an ordinary 256K byte read/write memory that resides on the RAM address and RAM data buses. It is expandable to 512K bytes by the addition of the RAM expansion module. It is implemented using standard dynamic RAMs, refreshed by Agnus.

The display RAM is really used for much more than just holding graphics data. It also stores code and data for the 68000.



AMIGA SYSTEM BLOCK DIAGRAM

ADDRESS MAP



CUSTOM ANIMATION CHIP

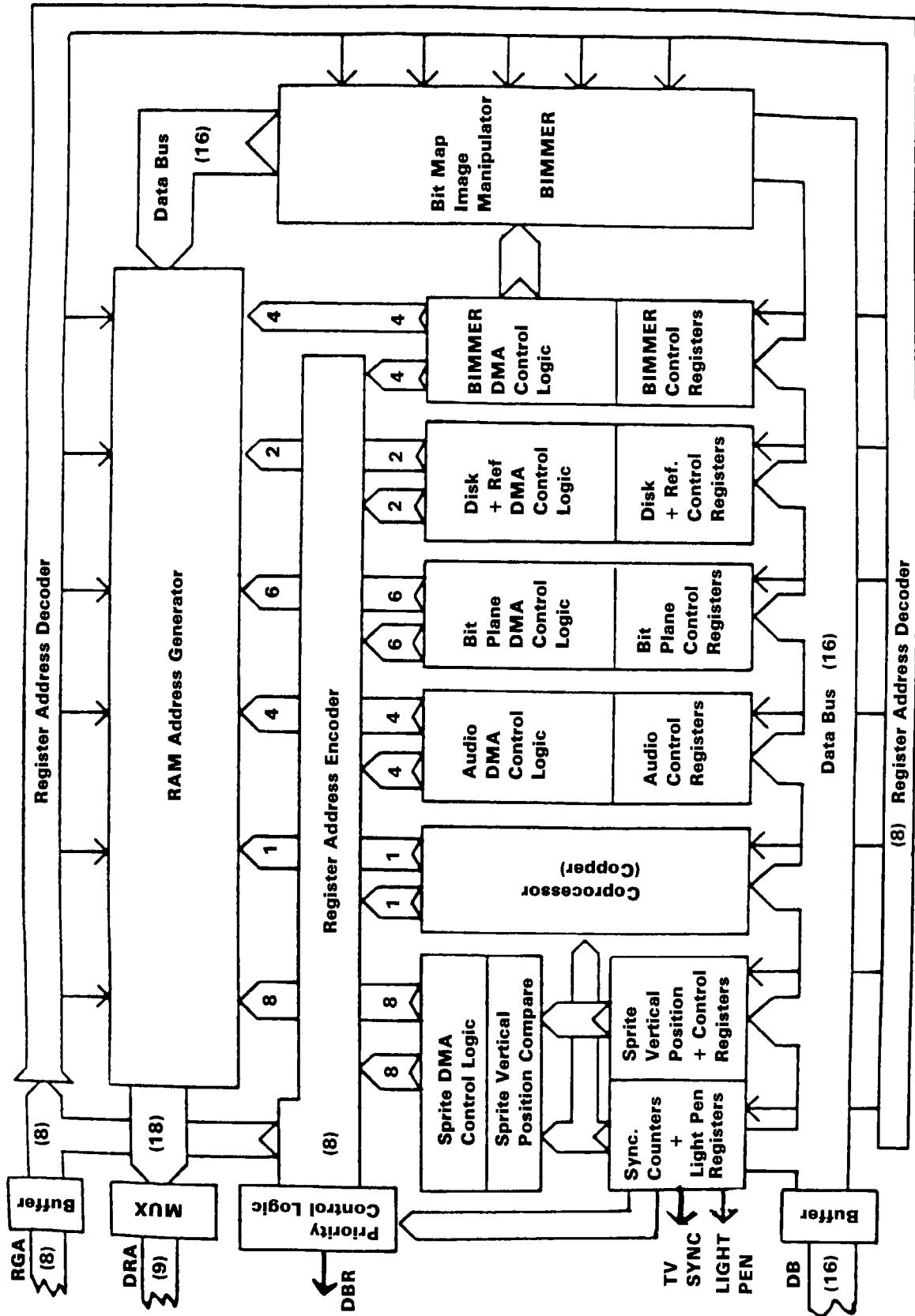
— Agnus —

FEATURES:

- Bit Blitter — Uses Hardware to Move Display Data — Allows High Speed Animation — Frees the CPU for other Concurrent Tasks
- Display Synchronized Coprocessor
- Controls 25 DMA Channels — Allows the Disk and Sound to Operate with Minimal CPU intervention

8361

PIN	DESIGNATION	FUNCTION	TYPE
D8	1	D9	
D7	2	D10	
D6	3	D11	
D5	4	D12	
D4	5	D13	
D3	6	D14	
D2	7	D15	
D1	8	VSS	
D0	9	HSY	
VCC	10	CSY	
RES	11	VSY	
INT3	12	FIR0	
DMAL	13	RGA1-8	
BLS	14	36-DRA8	
DBR	15	35-DRA7	
ARW	16	34-DRA6	
RGA8	17	33-DRA5	
RGA7	18	32-DRA4	
RGA6	19	31-DRA3	
RGA5	20	30-DRA2	
RGA4	21	29-DRA1	
RGA3	22	28-DRA0	
RGA2	23	27-VSS	
RGA1	24	26-CCKQ	
		25-CCK	
		17-24	
		25	I/O
		26	I
		27	I
		28-36	O
		37	I/O
		38	I
		/VSY	I/O
		/CSY	O
		/HSY	I/O
		Vss	I
		41	I
		42-48	I/O
		D9-D15	I/O



AGNUS BLOCK DIAGRAM

CUSTOM GRAPHICS CHIP

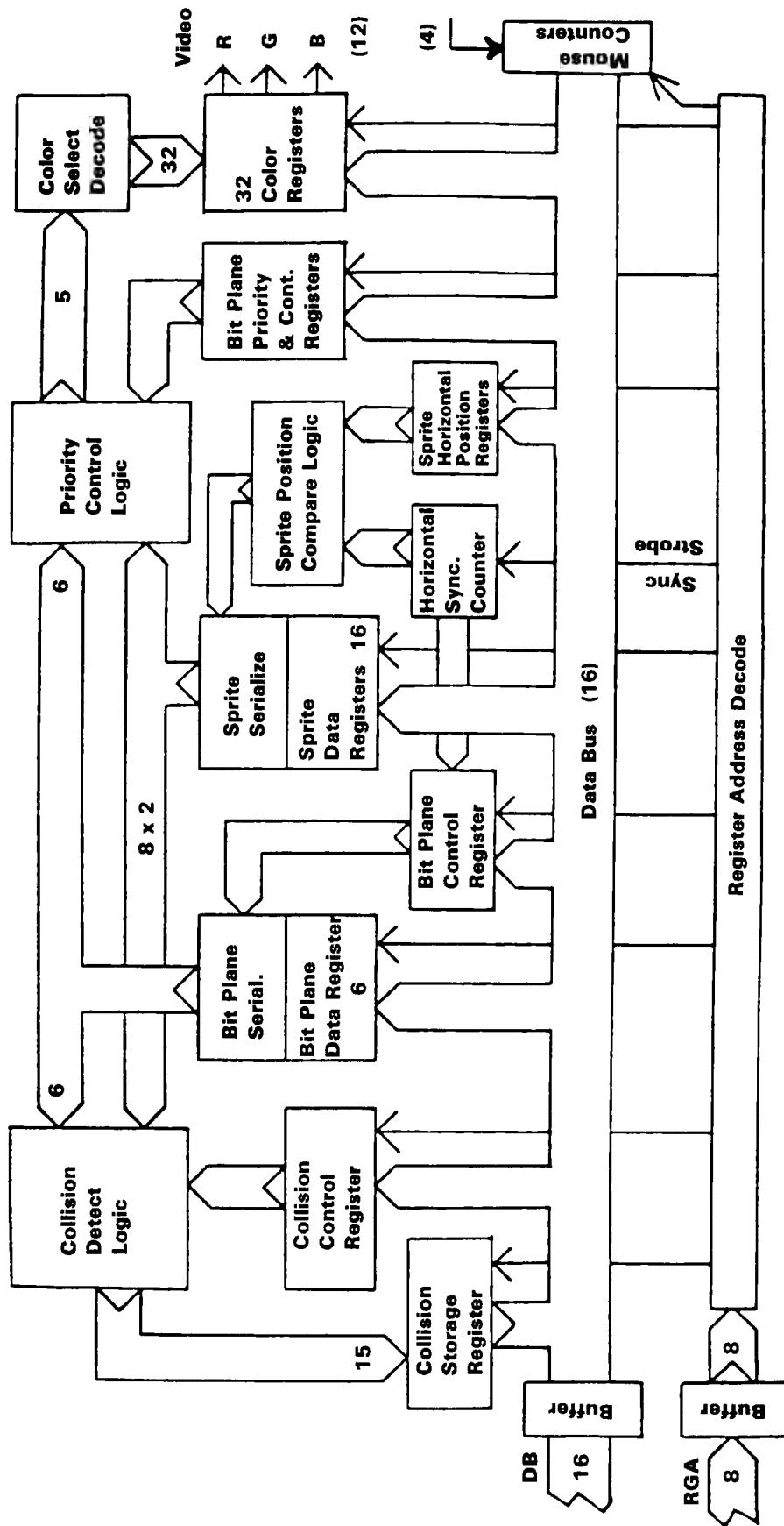
— Denise —

FEATURES:

- Many Different Resolutions 320 X 200 up to 640 X 400
- 4096 Colors on a TV or RGB Monitor
- Eight Re-usable Sprite Controllers
- 60 or 80 Column Text
- Same Software for All TVs and Monitors

8362

		PIN	DESIGNATION	FUNCTION	TYPE
D6	1	48	D7		
D5	2	47	D8		
D4	3	46	D9		
D3	4	45	D10		
D2	5	44	D11		
D1	6	43	D12	1-7 D0-D6	I/O
D0	7	42	D13	8 M1H	
M1H	8	41	D14	9 M0H	
M0H	9	40	D15	10-17 RGA1-8	
RGA8	10	39	M1V	18 /BURST	O
RGA7	11	38	M1H	19 Vcc	
RGA6	12	37	VSS	20-23 R0-3	O
RGA5	13	36	CCK	24-27 B0-3	O
RGA4	14	35	CLK	28-31 G0-3	O
RGA3	15	34	NC	32 N/C	N/C
RGA2	16	33	ZD	33 /ZD	O
RGA1	17	32	NC	34 N/C	N/C
BST	18	31	G3	35 7M	
VCC	19	30	G2	36 CCK	
R0	20	29	G1	37 Color Clock	
R1	21	28	G0	38 Ground	
R2	22	27	B3	39 Vss	
R3	23	26	B2	M0V Mouse 0 Vertical	
B0	24	25	B1	M1V Mouse 1 Vertical	
		40-48	D7-D15	Data Bus Lines 7-15	I/O



DENISE BLOCK DIAGRAM

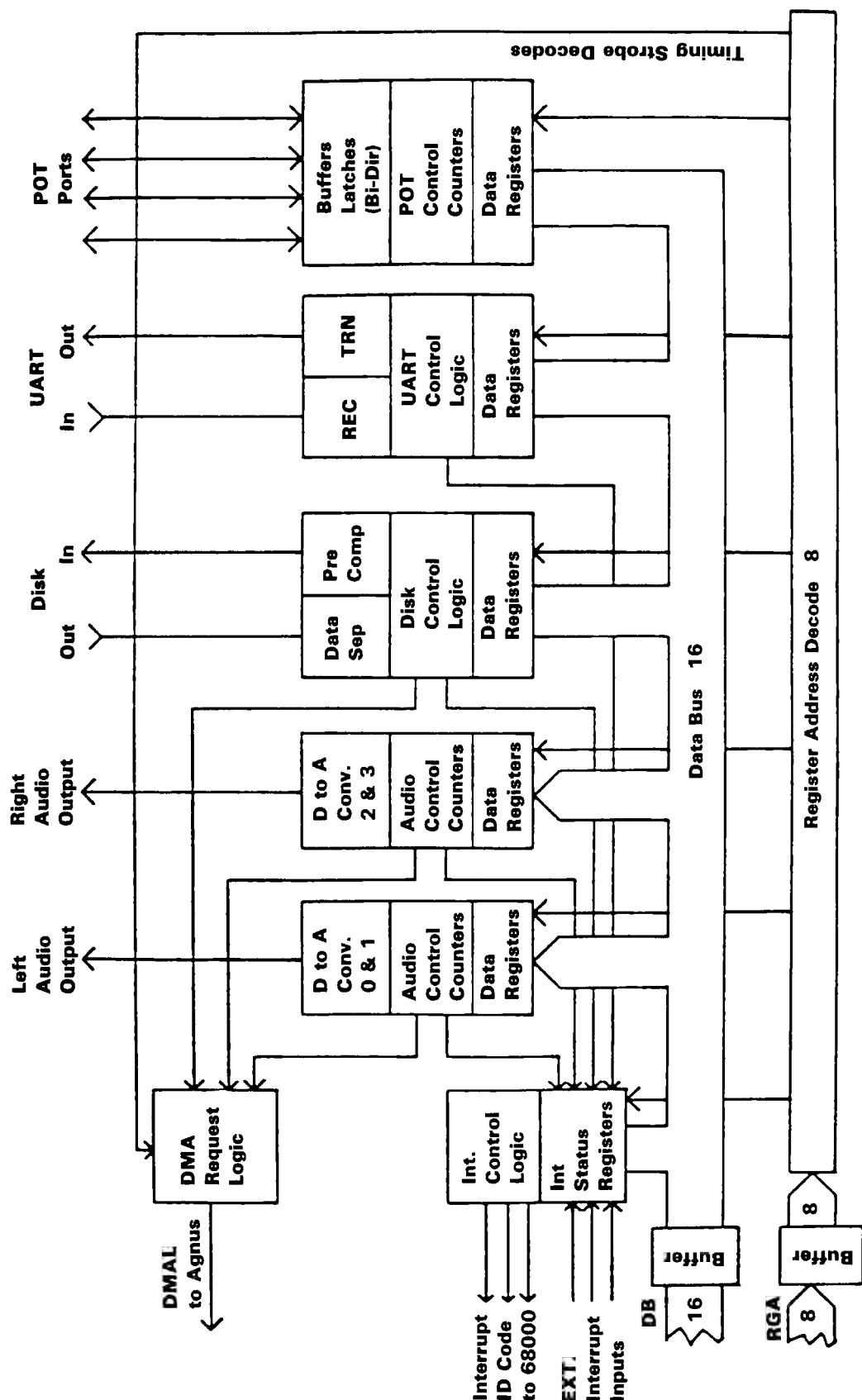
CUSTOM SOUND/PERIPHERALS CHIP

= Paula =

FEATURES:

- Four Voices of Sound Output configured as Two Stereo Channels
- Nine Octaves
- Complex Waveforms
- Uses both Amplitude and Frequency Modulation
- I/O Controls for Disk Data and Controller Ports
- Microdisk Controller
- Interrupt Control System

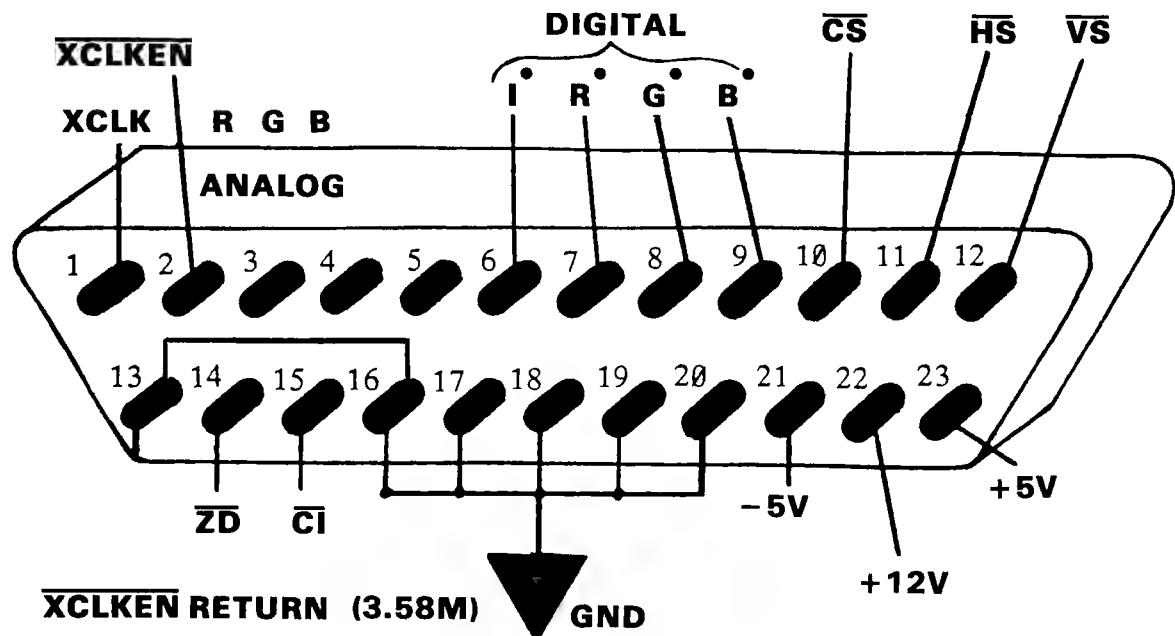
	PIN	DESIGNATION	FUNCTION	TYPE
D8	1	48	D9	
D7	2	47	D10	
D6	3	46	D11	
D5	4	45	D12	I/O
D4	5	44	D13	I/O
D3	6	43	D14	I
D2	7	42	D15	O
VSS	8	41	RXD	O
D1	9	40	TXD	I
D0	10	39	DKWB	I
RES	11	38	DKWD	I
DMAL	12	37	DKRD	I
IPL0	13	36	P1Y	O
IPL1	14	35	P1X	I/O
IPL2	15	34	ANAGND	I/O
INT2	16	33	P0Y	I
INT3	17	32	P0X	I/O
INT6	18	31	AUDA	I/O
RGA8	19	30	AUDB	I
RGA7	20	29	CCKQ	O
RGA6	21	28	CCK	O
RGA5	22	27	VCC	I
RGA4	23	26	RGA1	I
RGA3	24	25	RGA2	I/O
		42-48	D9-15	
8364				



PAULA BLOCK DIAGRAM

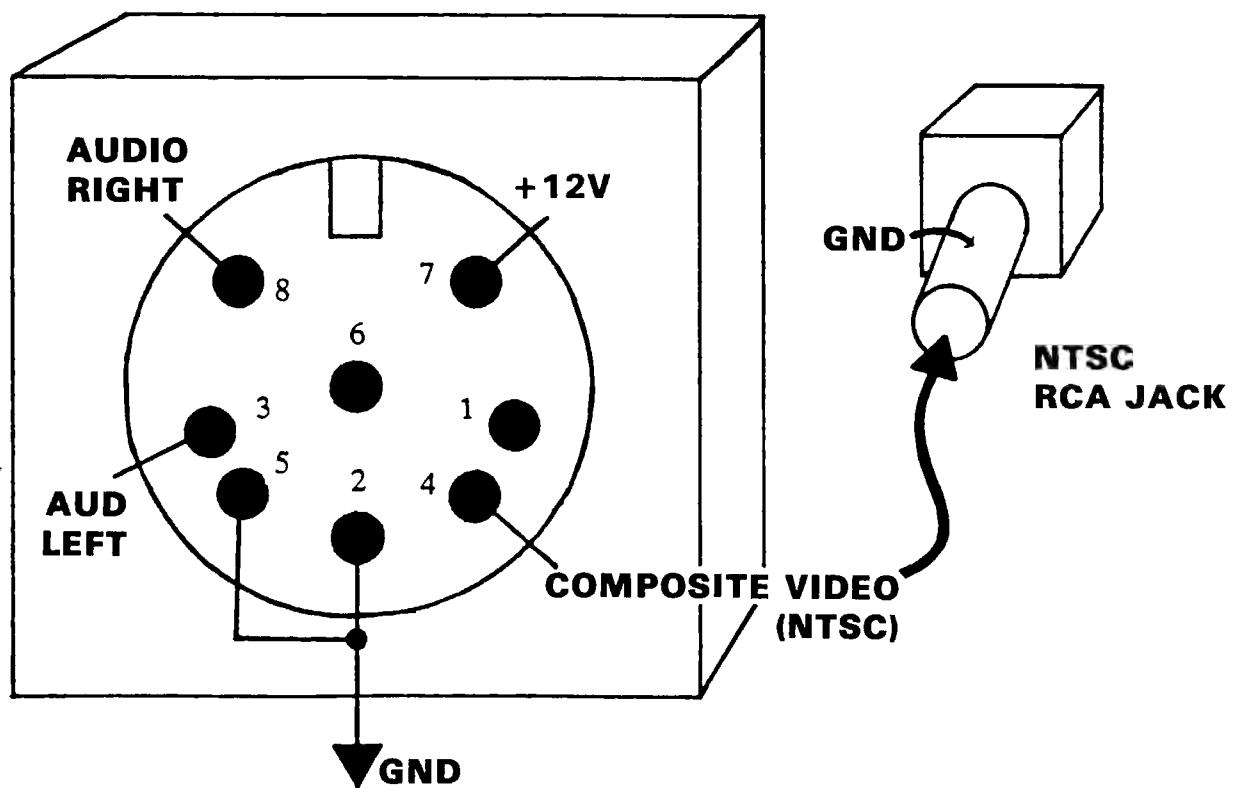
VIDEO CONNECTORS

— J3 RGB —



PIN	LINE	FUNCTION
1	/XCLK	External Clock Input
2	/XCLKEN	External Clock Enable
3	R	Analog Red
4	G	Analog Green
5	B	Analog Blue
6	I	Digital Intensity
7	R	Digital Red
8	G	Digital Green
9	B	Digital Blue
10	/CS	Composite Sync — Active Low
11	/HS	Horizontal Sync — Active Low
12	/VS	Vertical Sync — Active Low
13	GNDRTN	Return for XCLKEN
14	/ZD	Zero Detect — Active Low
15	/C1	Color Clock 3.58 MHz
16-20	GND	Ground
21	-5V	-5 VDC Power
22	+12V	+12 VDC Power
23	+5V	+5 VDC Power

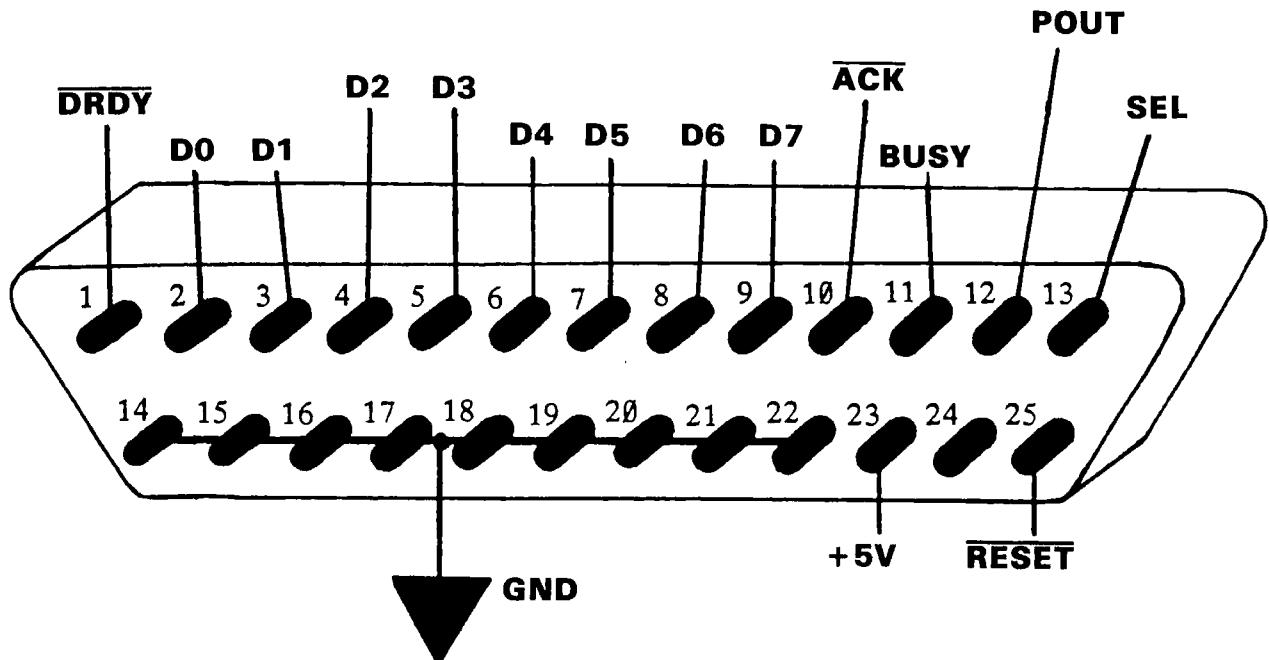
J2 COMPOSITE



Requires MODULATOR for 8-pin DIN composite video output.

PARALLEL PORT

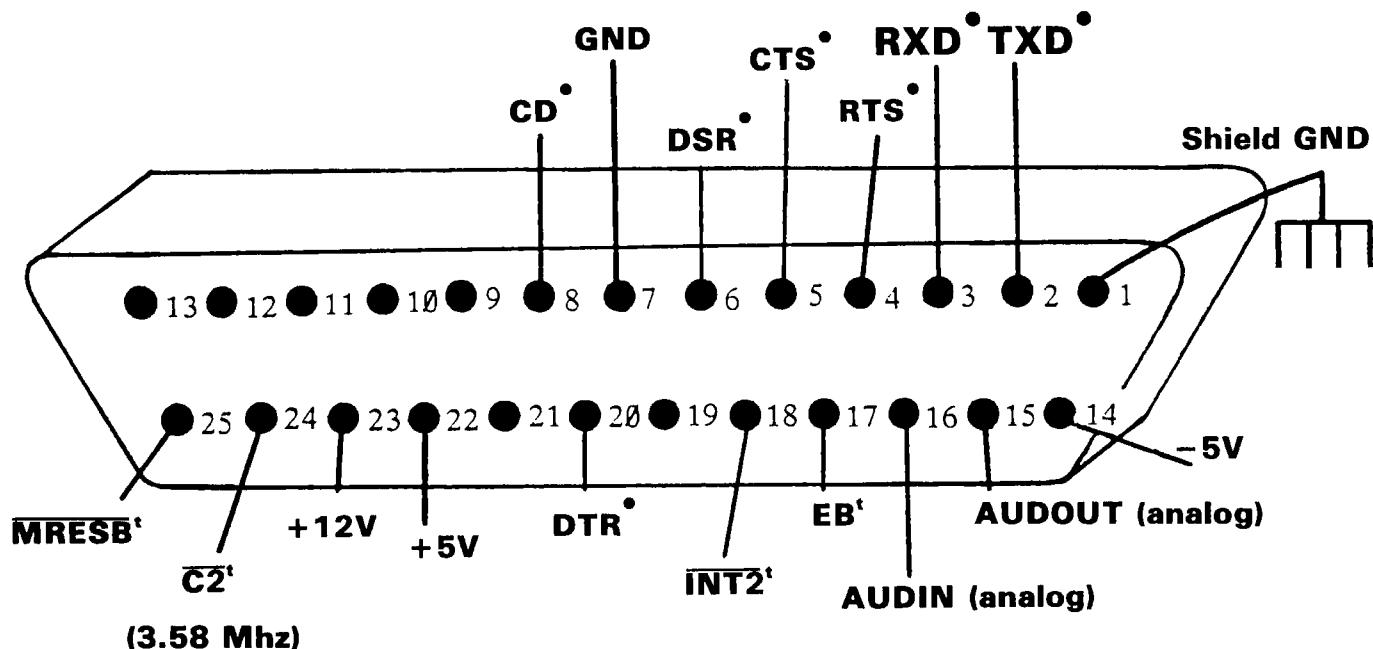
— J8 —



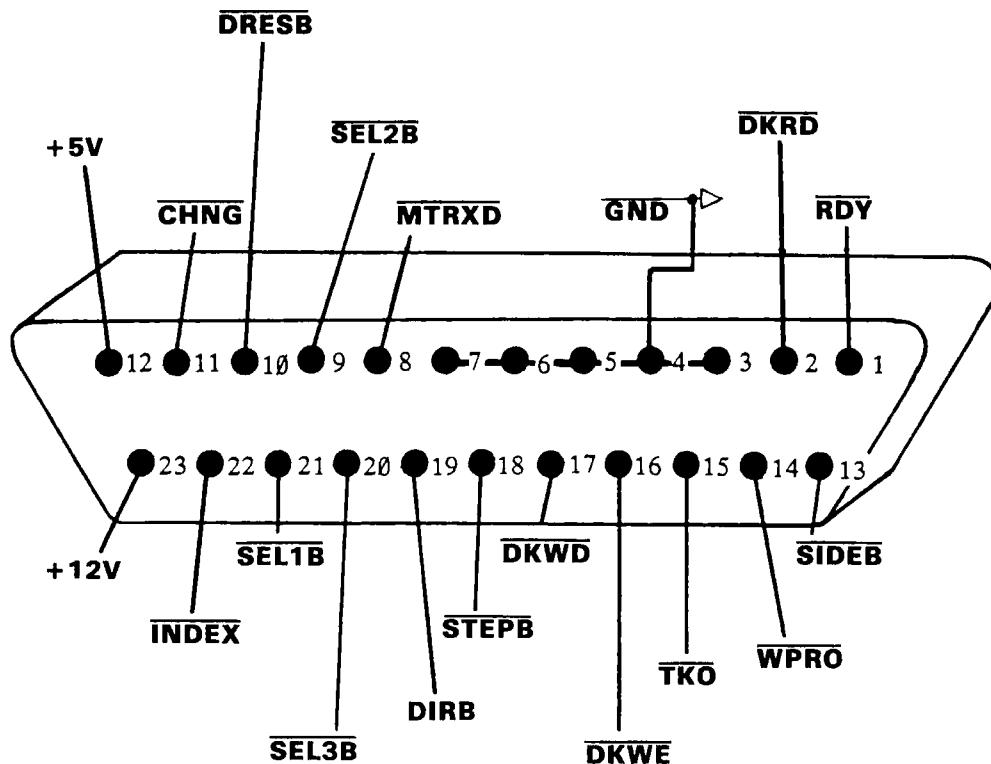
PIN	LINE	FUNCTION
1	/DRDY	Data Ready — Active Low
2-9	D0-D7	Data Lines 0-7
10	/ACK	Acknowledge — Active Low
11	BUSY	Busy
12	POUT	Paper Out
13	SEL	Select
14-22	GND	Signal Ground
23	+5	5 VDC Supply
24	N/C	
25	/RESET	Reset — Active Low

SERIAL PORT

— J6 —



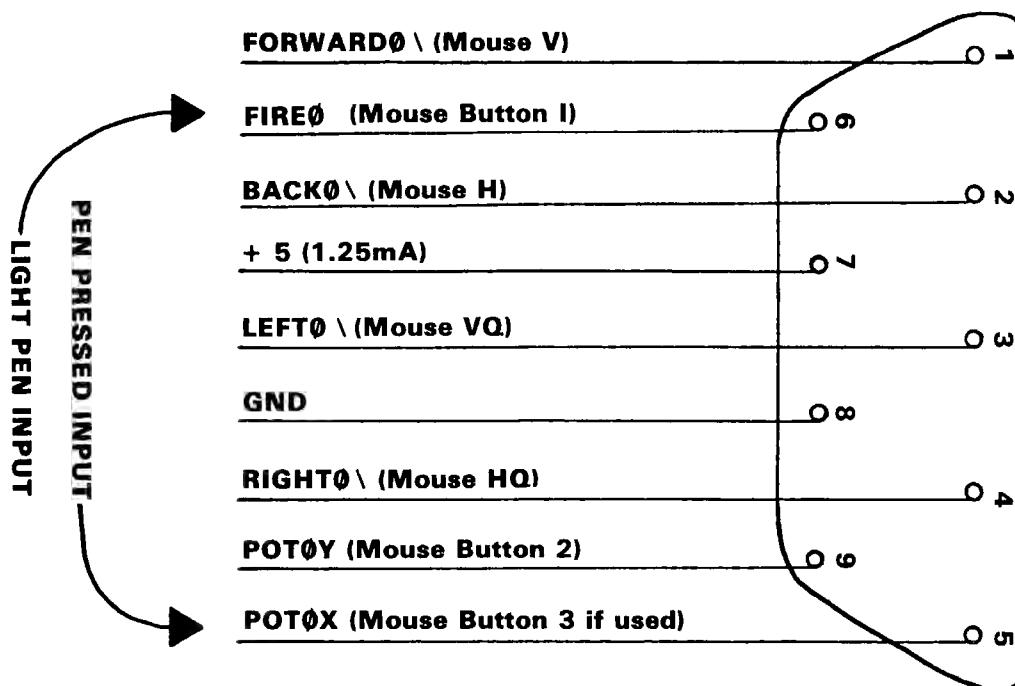
PIN	LINE	FUNCTION
1	GND	Frame Ground
2	TXD	Transmit Data
3	RXD	Receive Data
4	RTS	Request to Send
5	CTS	Clear to Send
6	DSR	Data Set Ready
7	GND	System Ground
8	CD	Carrier Detect
9-13	N/C	
14	-5V	-5 VDC Power
15	AUDOUT	Audio Out of Amiga
16	AUDIN	Audio Into Amiga
17	EB	Buffered Port Clock 716KHz
18	/INT2	Interrupt Line to Amiga
19	N/C	
20	DTR	Data Terminal Ready
21	N/C	
22	+5V	+ 5 VDC Power
23	+12V	+ 12 VDC Power
24	/C2	3.58MHz Clock
25	MRESB	Buffered System Reset

EXTERNAL DISK CONNECTOR**— J7 —**

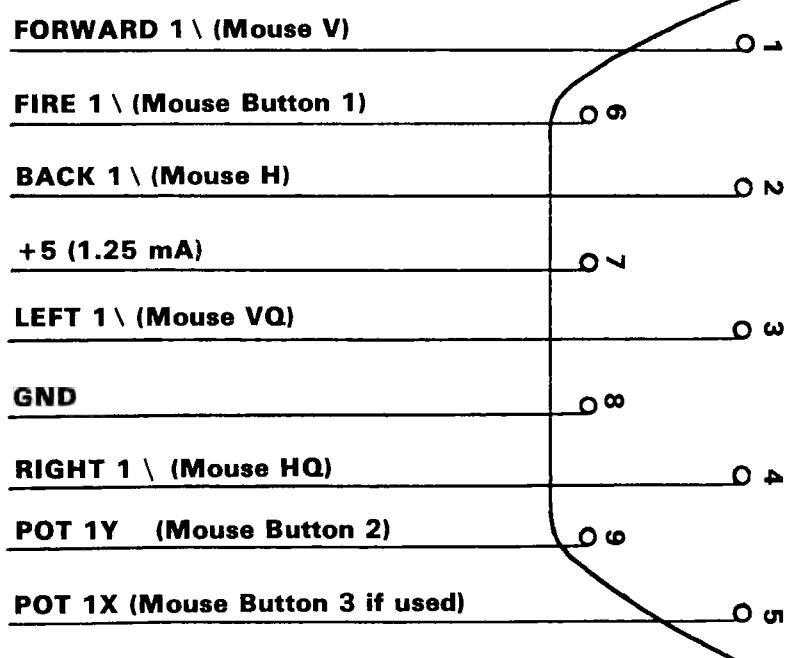
PIN	LINE	FUNCTION
1	/RDY	Disk Ready — Active Low
2	/DKRD	Disk Ready Data — Active Low
3-7	GND	Ground
8	/MTRXD	Disk Motor Control — Active Low
9	/SEL2B	Select Drive 2 — Active Low
10	/DRESB	Disk RESET — Active Low
11	/CHNG	Disk has been Removed from Drive — Latched Low
12	+5	5 VDC Supply
13	/SIDE _B	Select Disk Side — 0 = Upper 1 = Lower
14	/WPRO	Disk is Write Protected — Active Low
15	/TKO	Drive Head Position over Track O — Active Low
16	/DKWE	Disk Write Enable — Active Low
17	/DKWD	Disk Write Data — Active Low
18	/STEPB	Step the Head — Pulse, First Low then High
19	DIRB	Select Head Direction — 0 = Inner 1 = Outer
20	/SEL3B	Select Drive 3 — Active Low
21	/SEL1B	Select Drive 1 — Active Low
22	/INDEX	Disk Index Pulse — Active Low
23	+12	12 VDC Supply

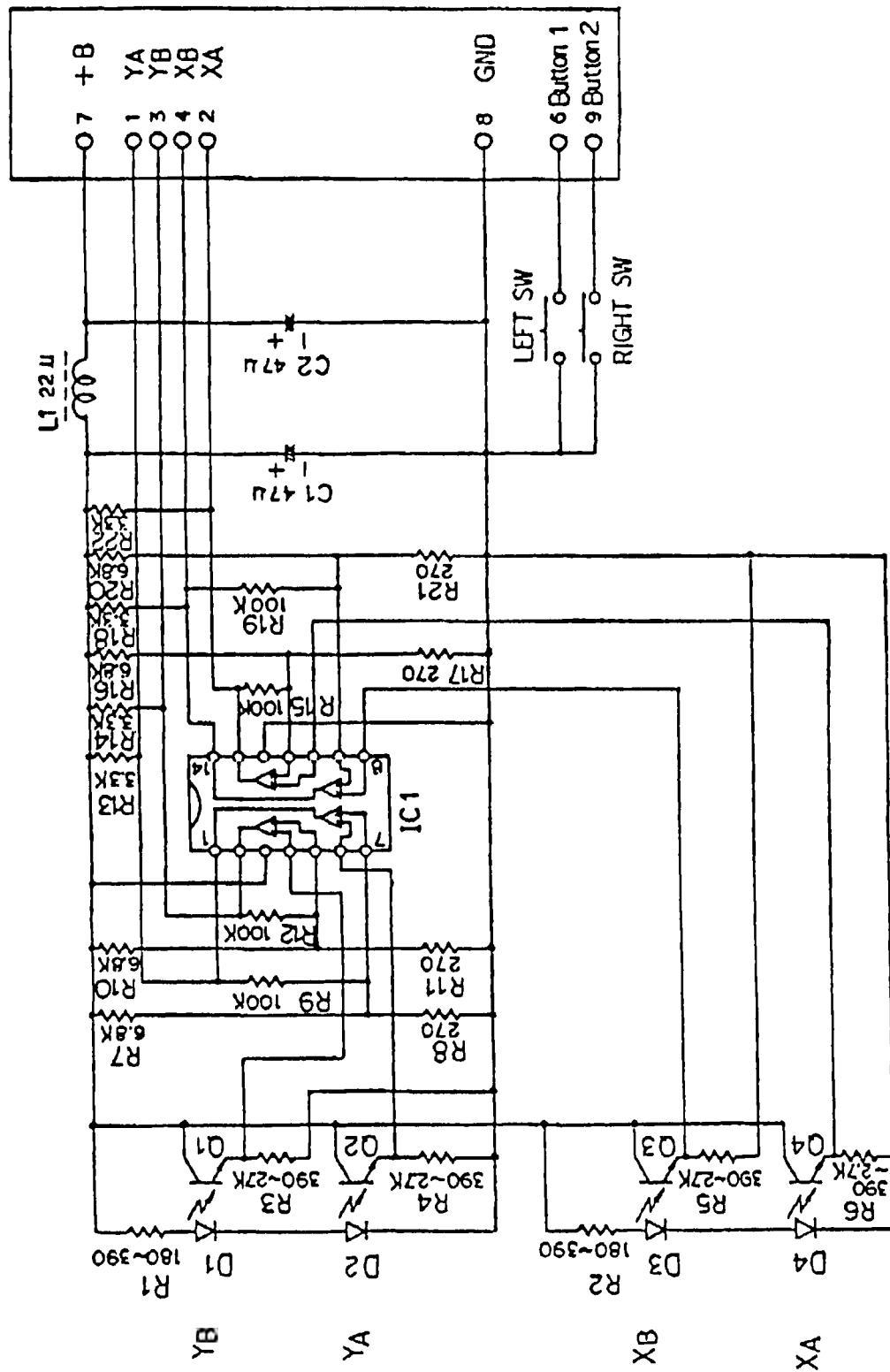
MOUSE/JOYSTICK/LIGHTPEN PORTS

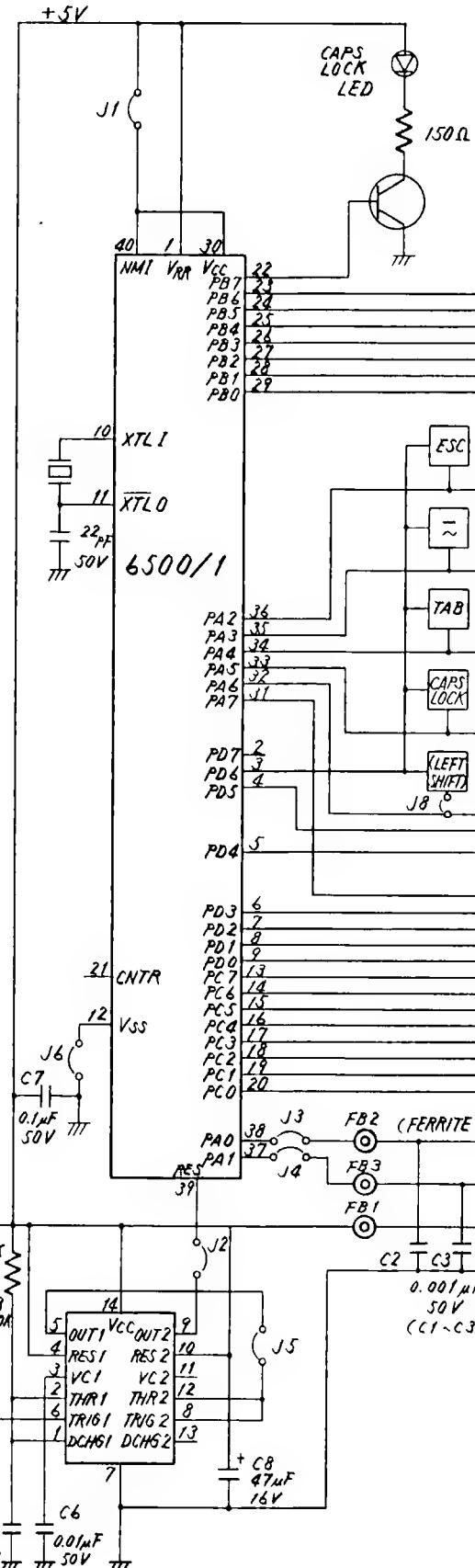
— J11 and J12 —

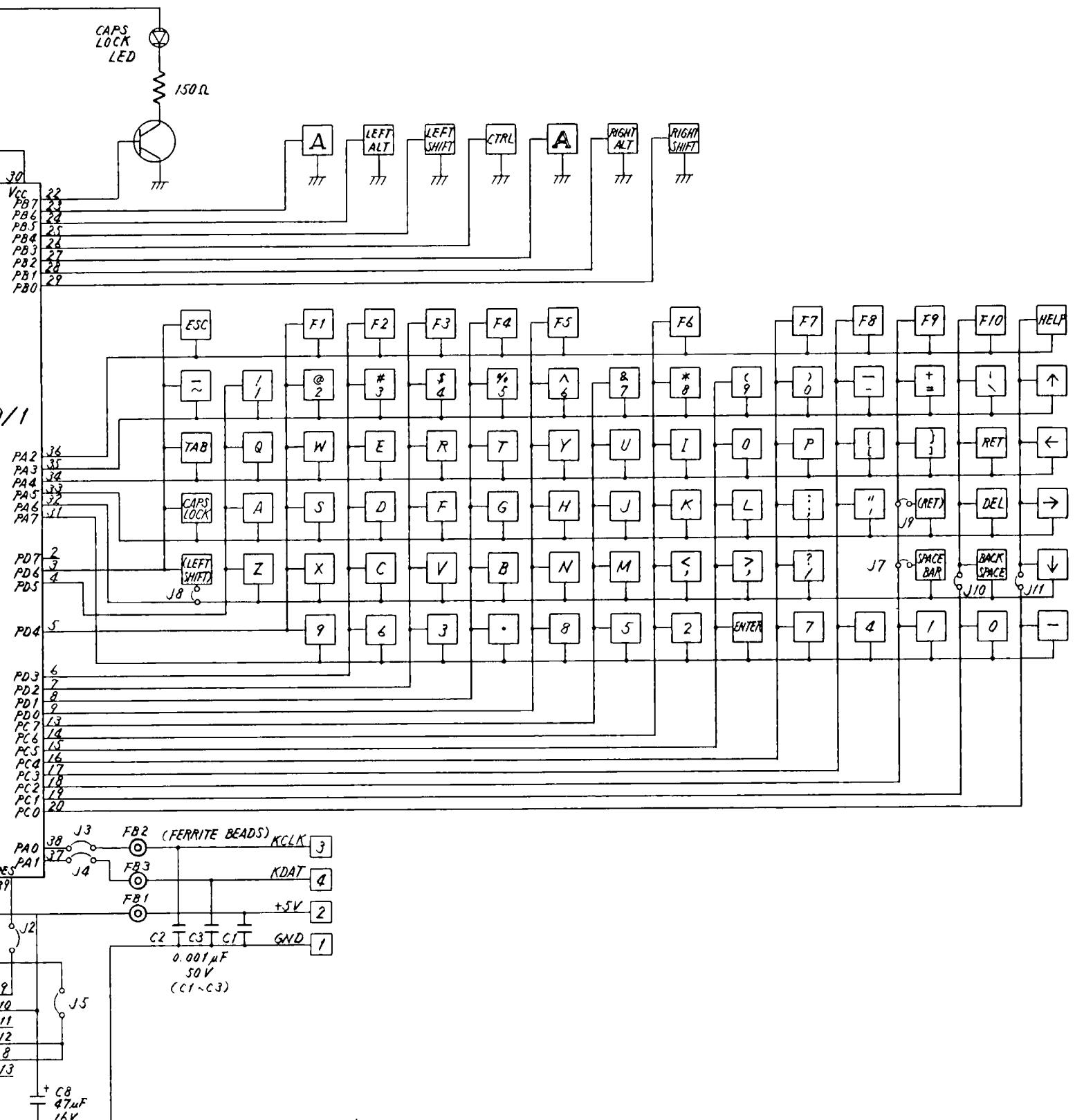


Port 0 is closer to Front

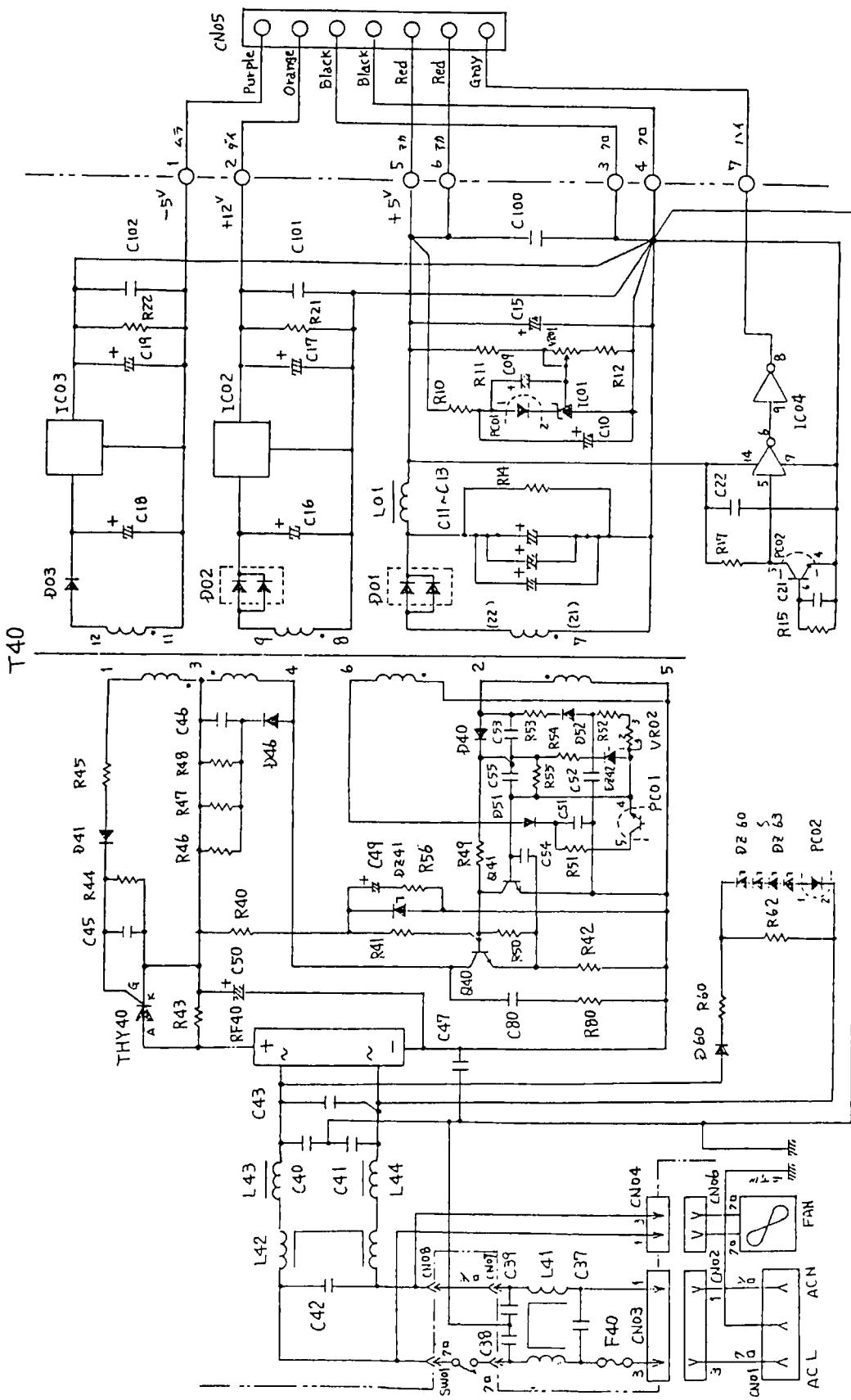








SCHEMATIC
AMIGA KEYBOARD ASSY #327063

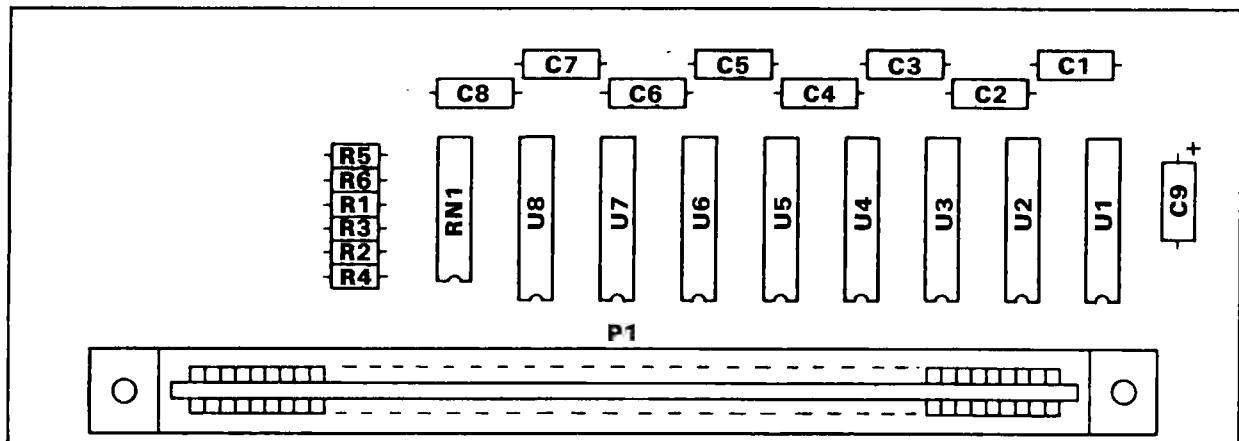


This drawing is provided for reference ONLY. It does not imply the serviceability of the Amiga Power Supply. It is the policy of Commodore Business Machines to REPLACE a defective power supply due to the unique parts used by the OEM supplier of the unit. UL requirements specify that EXACT replacement parts must be used.

SCHEMATIC
AMIGA POWER SUPPLY ASSY #3227173

RAM EXPANSION CARTRIDGE

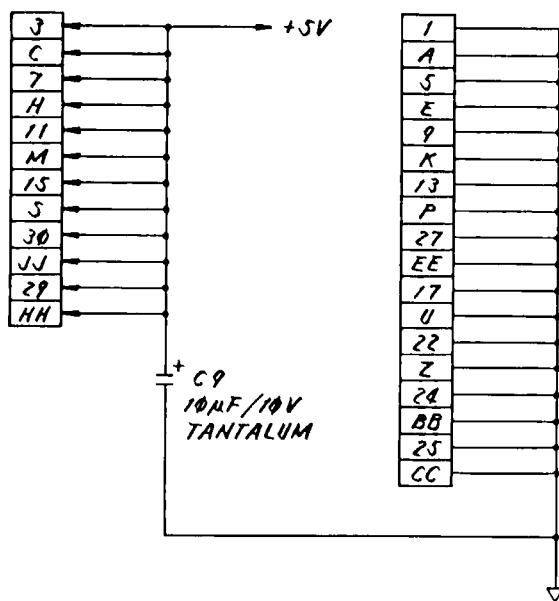
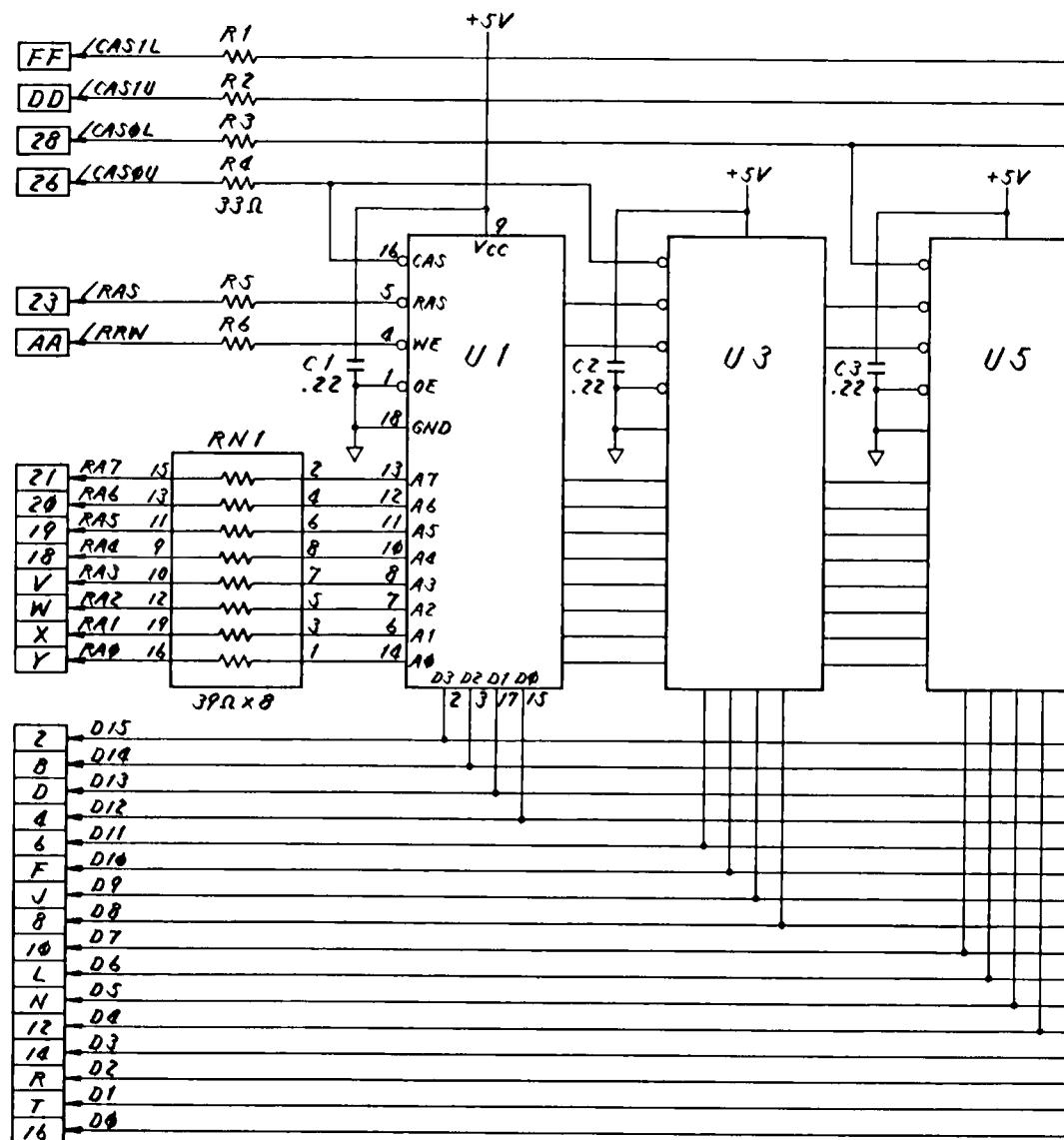
PCB ASSY #327186

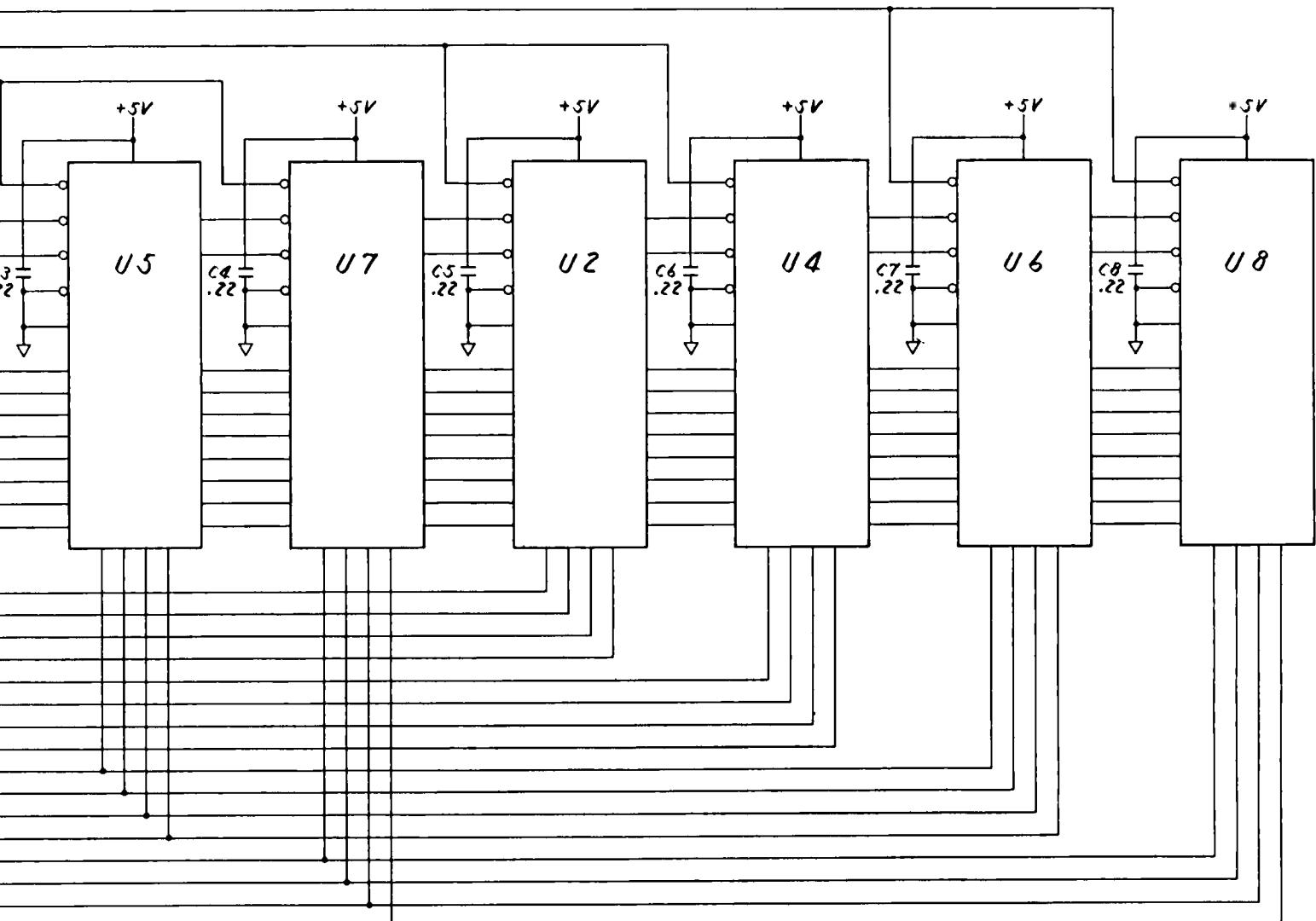


BOARD LAYOUT

PARTS LIST

U1-8	DRAM 64K x 4 120/150 nS
R1-6	CARBON RESISTOR 33Ω 1/4 W 5%
RN1	RESISTOR PACK DIP 8 pin 39Ω
C1-8 C9	CERAMIC CAPACITOR 0.22µF 50V TANTALUM CAPACITOR 10µF 10V
P1	CARD EDGE CNNCT 3.96 pitch 60 pin





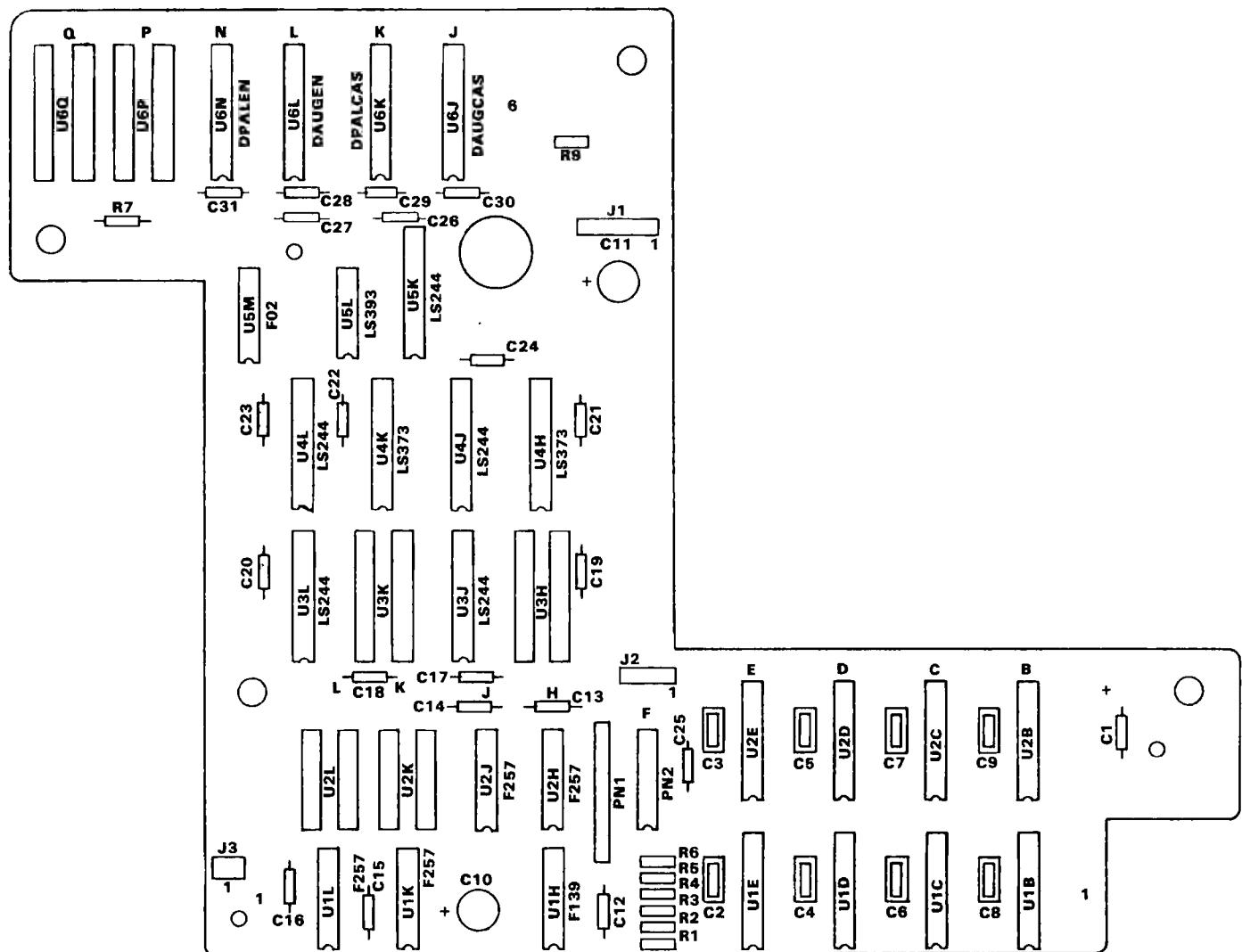
SCHEMATIC
RAM EXPANSION ASSY #252157

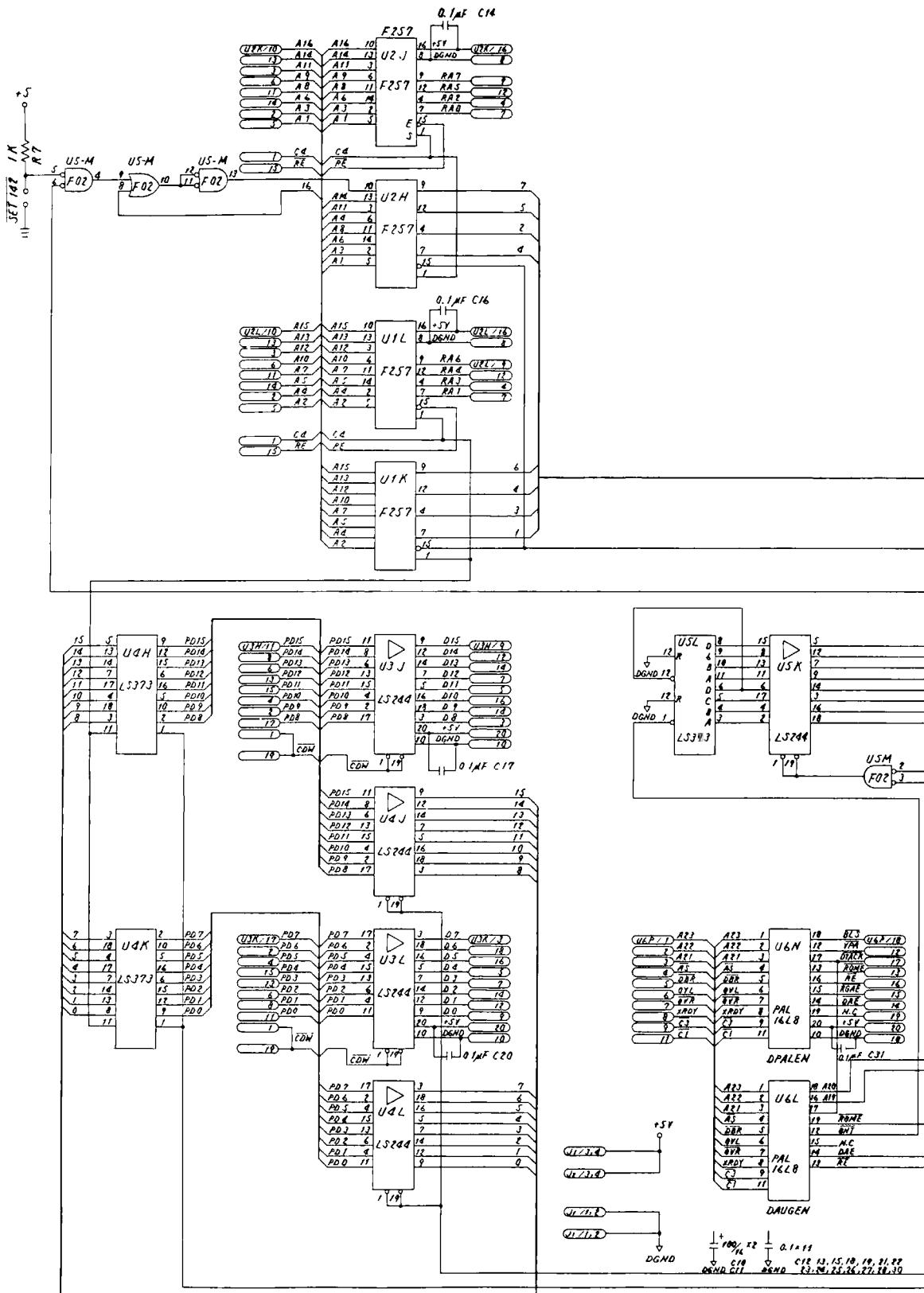
PIGGYBACK BOARD**PARTS LIST — PCB ASSEMBLY #327139****C — Indicates Commodore Stocked Part Number**

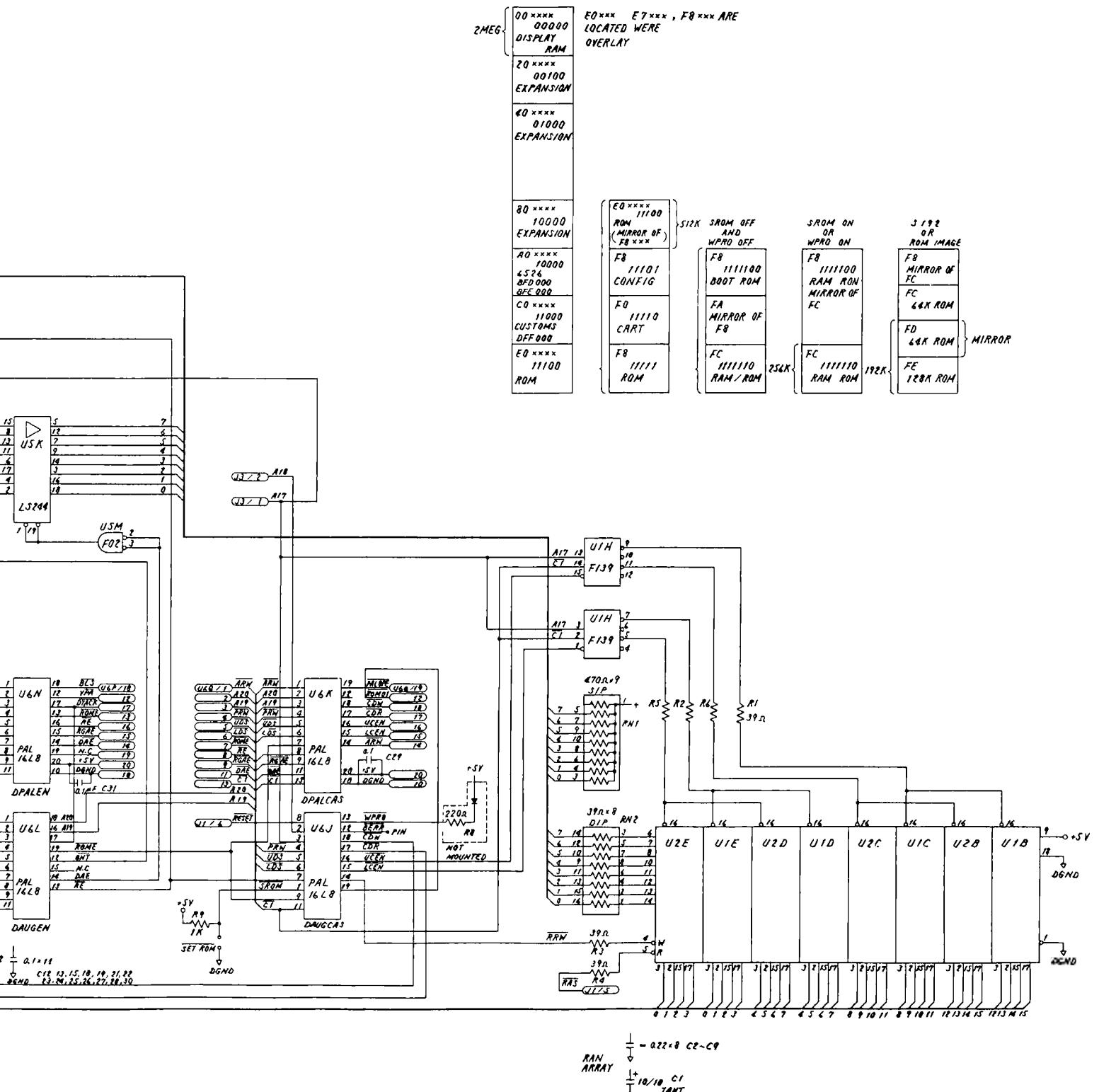
INTEGRATED CIRCUITS		RESISTOR PACKS	
U1B-U1E	DRAM 256K 15OnS	RN1	
U1H	74F139 Dual 1 of 4 Decoder	U2F	
U1K, U1L	74F257 Multiplexer	CAPACITORS	
U2B-U2E	DRAM 256K 15OnS	C1	Tantalum 10 μ F 10V 20%
U2H, U2J	74F257 Multiplexer	C2-9	Monolithic 0.22 μ F 50V
U2K,U2L	Refer to CONNECTORS	C10-11	Electrolytic 100 μ F 16V 20%
U3J, U3L	74LS244 Octal Buffer	C12-31	Monolithic 0.1 μ F 50V
U3K, U3H	Refer to CONNECTORS	CONNECTORS	
U4H	74LS373 Transparent Latch	J1	Gold Female Top Entry Type C
U4J	74LS244 Octal Buffer	J1	6 pin Molex 4455CC6
U4K	74LS373 Transparent Latch	J2	4 pin Molex 4455CC4
U4L, U5K	74LS244 Octal Buffer	J3	2 pin Molex 4455CC2
U5L	74LS393 Dual Module Cntr.	U2K, U2L	8 pin Molex 4455CC8
U5M	74F02 Quad NOR	U3K, U3H,	10 pin Molex 4455CC10
U6J	PAL DAUG CAS	U6P, U6Q	
U6K	PAL CAS		
U	PAL DAUG EN		
U	PAL EN		
U	Refer to CONNECTORS		
RESISTORS — All values are in ohms- 1/4 W with a 5% tolerance unless noted otherwise.			
R1-6	39		
R7-9	1K		

PIGGYBACK BOARD

PCB ASSY #327139







PARTS LIST – PCB ASSEMBLY #327137

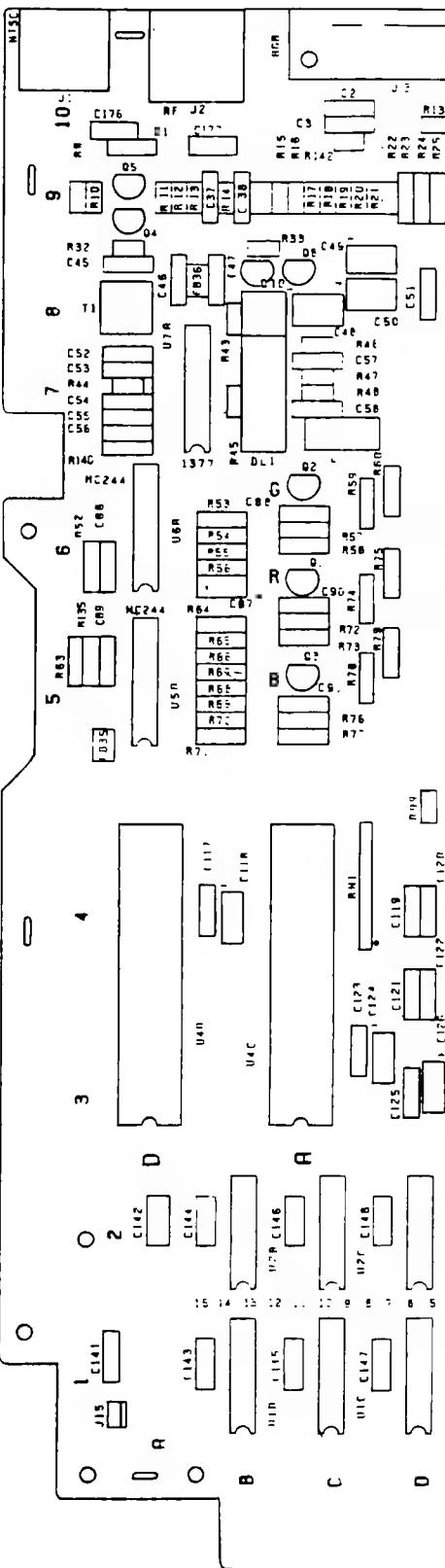
INTEGRATED CIRCUITS		RESISTORS — All values are in ohms- 1/4 W with a 5% tolerance unless noted otherwise.				
U1B,C,D,E	64K x 4 DRAM 256K BIT 15ONS	R1	360	R71	8060	1%
U1H,I	74F138 1 of 8 Decoder sub: 74S138 1 of 8 Decoder	R2	1K	R72	287	1%
U1J	74F399 MUX Latch	R3	360	R73	1150	1%
U1M	74LS157 Multiplexer	R4,5	1K	R74	100	1%
U2B,C,D,E	64K x 4 DRAM 256K BIT 15ONS	R6	47	R75	49.9	1%
U2H	74F374 Octal Latch sub: 74AS374 Octal Latch	R7,8	100	R76	287	1%
U3H,J	74LS373 Transparent Latch	R9	75	R77	1150	1%
U4A	8362 DENISE C 252126-01	R10	220	R78	100	1%
U4C	8361 AGNUS C 252125-01	R11	75	R79	49.9	1%
U4E	8364 PAULA C 252127-01	R12	220	R80	47	
U4H	74F74 D Flip-Flop sub: 74AS74 D Flip-Flop	R13,14	1K	R81,82	10K	
U4J	74LS244 Octal Buffer	R15	470	R83,84	360	
U4M	LM2901 Quad Comparator sub: TA75339 Quad Comparator	R16	75	R85	1100	1%
U5A	74HC244 CMOS Octal Buffer	R17-22	47	R86	1150	1%
U5G	LF347 Quad Op-Amp sub: μ A4048 Quad Op-Amp	R23-25	75 1%	R87	750	
U5N	ROM Bootstrap EVEN C 252179-01	R26		R88,89	36K	
U5P	ROM Bootstrap ODD C 252180-01	R27	10K	R90	750	
U6A	74HC244 CMOS Octal Buffer	R28,29	33	R91,92	3.3K	
U6K	LM1488 RS-232 Driver	R30,31	47	R93	36K	
U6L	LM1489A RS-232 Receiver	R32,33	3.3K	R94,95	100	
U6M	74LS32 Quad OR Gate	R34-36	33	R96	36K	
U6N,P	8520 CIA C 318029-01	R37	910	R97,98	3.3K	
U6S	68000 CPU 8MHZ/10MHZ/12.5MHZ	R38-42	47	R99	0.47	
U7A	MC1377 RGB to NTSC	R43	1K		sub: 0.5	
U7M	74LS04 Hex Inverter	R44	220	R100	1K	
U7N	7407 Hex Buffer O.C.	R45	1K	R101	1M	
U7P	7438 Quad NAND O.C.	R46	3.3K	R102	10K	
U7R	7407 Hex Buffer O.C.	R47	1K	R103,104	1K	
U8G,H,I	74F74 D Flip-Flop sub: 74AS74 D Flip-Flop	R48	3.3K	R105	100K	
U9G,I	74S51 Dual A/O/I Gate	R49	1K	R106	22K	
TRANSISTORS		R50,51	3.3K	R107	33	
Q1,2,3	NPN 2SC 3504 (Sanyo)	R52	1690 1%	R108	200	
Q4,5	NPN 2SC 945A (NEC)	R53	1000 1%	R109	470	
Q8	NPN 2SC 752G (Toshiba)	R54	2000 1%	R110	1.5 1/2W	
Q9	PNP 2SB 825 (Sanyo)	R55	4020 1%		5%	
Q10	NPN 2SC 945A (NEC)	R56	8060 1%	R111,112	1K	
Q18	PNP 2SA 733 (NEC) sub: PNP 2SA 564 (Matsushita) sub: PNP 2SA 608 (Sanyo)	R57	287 1%	R113	39	
DIODES		R58	1150 1%	R114,115	1	
CR2	IN4148 sub: 1S1588	R59	100 1%	R116-119	220	
		R60	49.9 1%	R120	150	
		R61	560	R121,122	1	
		R62	1.2K	R123-126	220	
		R63	3920 1%	R127	150	
		R64	1000 1%	R128-133	39	
		R65	2000 1%	R134	47	
		R66	4020 1%	R135	3920 1%	
		R67	8060 1%	R136-139	470	
		R68	1000 1%	R140	220K	
		R69	2000 1%	R141	10	
		R70	4020 1%	R142	10K	

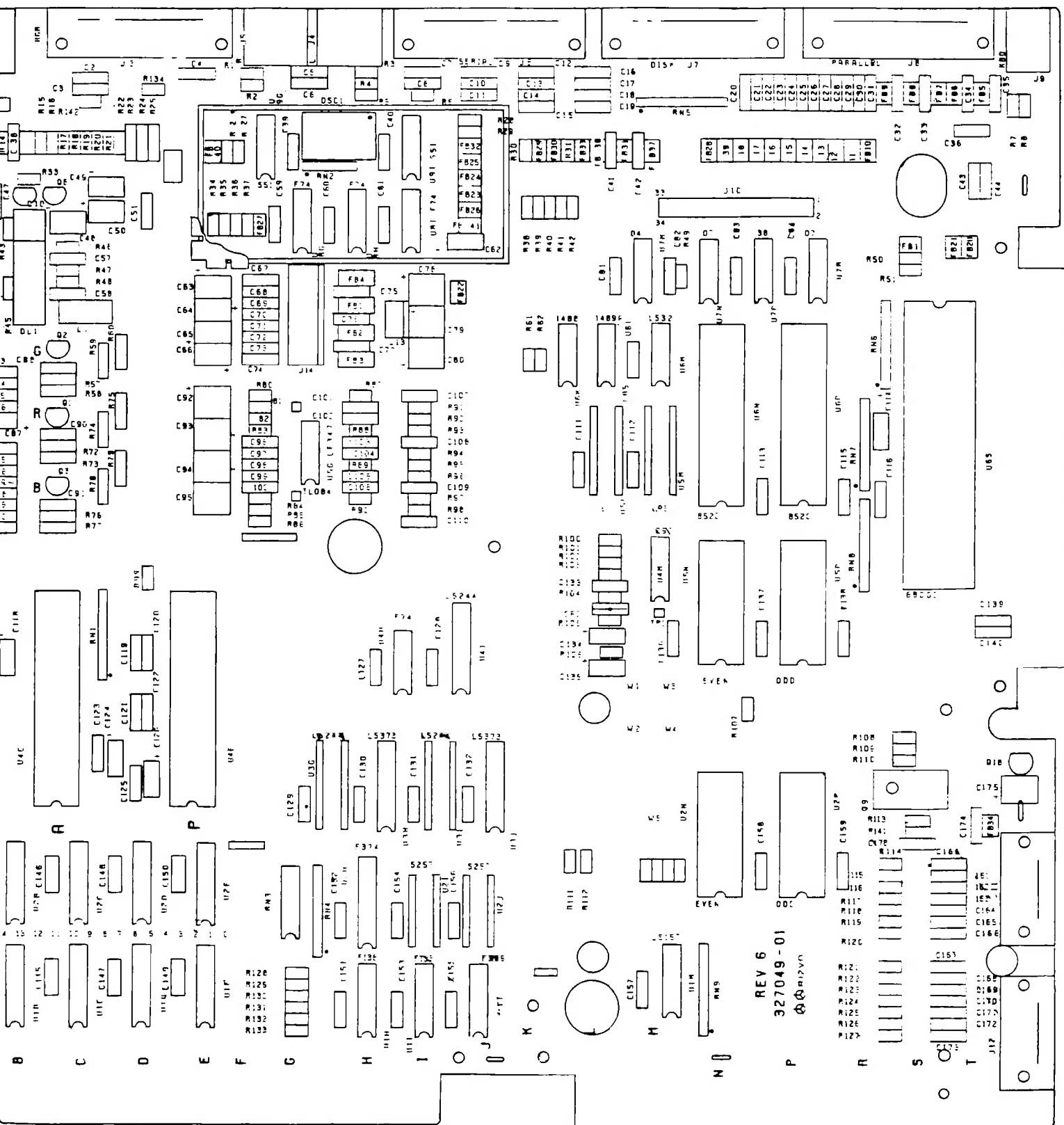
PARTS LIST — PCB ASSEMBLY #327137 (Continued)

RESISTOR PACKS				CAPACITORS (Continued)			
RN1	1K	1/10w SIP	10 pin pin 1 common	C74	MONO	1000pF	50V
RN2	1K	SIP	6 pin pin 1 common	C75-77	MONO	0.1μF	50V
RN3	39	DIP	16 pin isolated	C78-80	ELECT	100μF	16V
RN4	470	1/8w SIP	10 pin pin 1 common	C81-86	MONO	0.1μF	50V
RN5	1K	1/10w SIP	10 pin pin 1 common	C87	TANT	10μF	10V 20%
RN6	10K	1/8w SIP	10 pin pin 1 common	C88	MONO	0.01μF	50V
RN8	2.7K	1/8w SIP	10 pin pin 1 common	C89	MONO	0.1μF	50V
RN9	100K	1/10w SIP	10 pin pin 1 common	C90,91	MONO	0.01μF	50V
CAPACITORS				C92	ELECT	47μF	16V (REV.A)
C1	MONO	0.1μF	50V	C93	ELECT	100μF	16V (REV.6)
C2-4	MONO	0.01μF	50V	C94	OMITTED		(REV.A)
C5,6	MONO	0.1μF	50V	C95	ELECT	220μF	16V (REV.A)
C7-15	MONO	1000pF	50V	C96-100	ELECT	100μF	16V (REV.6)
C16	MONO	0.01μF	50V	C101	MONO	0.01μF	50V
C17-19	MONO	1000pF	50V	C102	MONO	0.0047μF	50V
C20,21	MONO	0.01μF	50V	C103,104	MONO	220pF	50V
C22	MONO	1000pF	50V	C105	MONO	0.0047μF	50V
C23-35	MONO	470pF	50V	C106	MONO	0.01μF	50V
C36	MONO	0.01μF	50V	C107	MONO	0.047μF	50V
C37-40	MONO	0.1μF	50V	C108,109	MONO	0.01μF	50V
C41,42	MONO	0.01μF	50V	C110	MONO	0.047μF	50V
C43,44	MONO	1000pF	50V	C111-113	MONO	0.1μF	50V
C45	MONO	47pF	50V	C114	TANT	10μF	10V 20%
C46	MONO	0.1μF	50V	C115-117	MONO	0.1μF	50V
C47	MONO	1000pF	50V	C118	TANT	10μF	10V 20%
C48-50	ELECT	22μF	25V	C119-122	MONO	0.047μF	50V
C51	MONO	0.01μF	50V	C123	MONO	0.1μF	50V
C52,53	MONO	0.1μF	50V	C124	TANT	10μF	10V 20%
C54	MONO	100pF	50V	C125	MONO	0.1μF	50V
C55-57	MONO	0.01μF	50V	C126	TANT	10μF	10V 20%
C58	MONO	47pF	50V	C127-133	MONO	0.1μF	50V
C59-61	MONO	0.1μF	50V	C134,135	TANT	10μF	10V 10%
C62	TANT	10μF	10V 20%	C136-138	MONO	0.1μF	50V
C63-66	ELECT	22μF	25V	C139,140	MONO	0.01μF	50V
C67	MONO	0.1μF	50V	C141	MONO	1000pF	50V
C68	MONO	1000pF	50V	C142	TANT	10μF	10V 20%
C69	MONO	0.1μF	50V	C143-150	MONO	0.22μF	50V
C70	MONO	1000pF	50V	C151-159	MONO	0.1μF	50V
C71	MONO	0.1μF	50V	C162-166	MONO	1000pF	50V
C72	MONO	1000pF	50V	C169-173	MONO	1000pF	50V
C73	MONO	0.1μF	50V	C174	MONO	0.01μF	50V
				C175	ELECT	100μF	16V
				C176,177	MONO	470pF	50V
				C178	MONO	0.1μF	50V

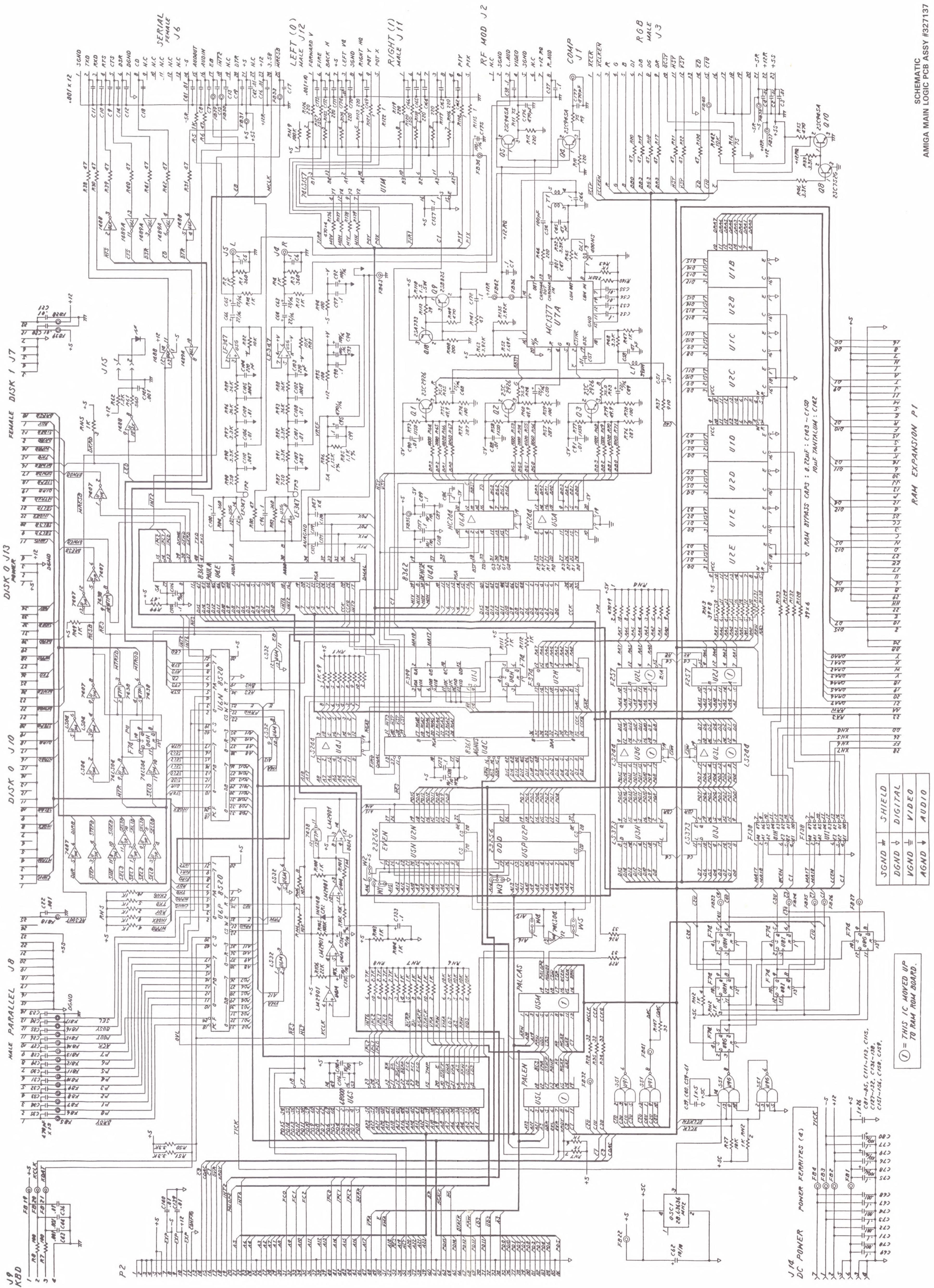
PARTS LIST — PCB ASSEMBLY #327137 (Continued)

CONNECTORS		CONNECTORS (Continued)		
J1	RCA Jack, Yellow	U2I,J	Header Assy 2.54 pitch, 8 pin	
J2	8 Pin Din	U3G,I	Header Assy 2.54 pitch, 10 pin	
J3	D-Sub, 23 Pin Male, Rt Angle	U5L,M	Header Assy 2.54 pitch, 10 pin	
M59-23- 20-738P- 3	C 325573-01	MISCELLANEOUS		
J4	RCA Jack, Red	DL1	Delay Line 400 nS TDK DL122401D- 1533 sub: Toko H321LNP- 1436PBAB	
J5	RCA Jack, White	FB1-4	Power Ferrites	
J6	D-Sub, 25 Pin Female, Rt Angle	FB5-43	Ferrite Beads	
M59-25- 30-435S- 4	TRW	L1	Coil Inductor 39 μ H 10%	
J7	D-Sub, 23 Pin Female, Rt Angle	OSC1	Crystal Module 28.63636 MHZ 25ppm C 325566-12 sub: 28.63636 MHZ 15ppm C 325566-14	
M59-23- 30-435S- 4	TRW	T1	Chroma Bandpass Transformer Toko 166NNF- 10264AG	
J8	D-Sub, 25 Pin Male, Rt Angle		RF Shield Box C 327044-01	
M59-25- 30-738P- 3	TRW		RF Shield Top C 327045-01	
J9	RJ11 PCB Mtg Cnnct Rt Angle Gold Plt Molex 90077-1040			
J10	Header Assy 2.54 pitch, 34 pin			
J11,12	D-Sub, 9 Pin Male, Rt Angle TRW M59-09-30-837P			
J13	Header Assy 2.54 pitch, 4 pin			
J14	Header Assy 3.96 pitch, 7 pin			
J15	Header Assy 2.54 pitch, 2 pin			





**BOARD LAYOUT
AMIGA MAIN LOGIC PCB ASSY #327137**



CBM APPROVED VENDORS FOR GENERIC PARTS

Component parts are stocked by Commodore if they are custom, proprietary or difficult to obtain in the field. Those common components that are available from many sources are considered GENERIC and are best obtained from your local parts distributor. Often critical parameters may vary between manufacturers and will affect the performance of a product. It is strongly RECOMMENDED that you use only parts from vendors that have been qualified and APPROVED by Commodore for use in our products. If you have a board with ORIGINAL parts and the vendor is not listed as approved, you may assume that the vendor was approved after this printing and also may be used as a replacement part.

RAM 64K X 4 BIT DYNAMIC RAM

ACCESS TIME	HITACHI	FUJITSU	NEC
150 nS	HM50464P-15	MB81464-15	D41464C-15

CPU 68000 MICROPROCESSOR

	HITACHI	MOTOROLA	ROCKWELL	SIGNETICS
8 MHZ	68000L8	68000L8	R68000P8	SCN68000C8N64
10 MHZ	68000L10	68000L10	X	X
12.5 MHZ	68000L12	68000L12	X	X

TTL DEVICES

7407	T.I., NATIONAL, SIGNETICS, MOTOROLA
7438	T.I., NATIONAL, SIGNETICS, MOTOROLA
74AS74	T.I.
74AS374	T.I.
74F02	FAIRCHILD
74F74	FAIRCHILD
74F138	FAIRCHILD
74F139	FAIRCHILD
74F257	FAIRCHILD
74F374	FAIRCHILD
74F399	FAIRCHILD
74HC244	T.I., NATIONAL, TOSHIBA
74LS04	T.I., NATIONAL, SIGNETICS, MOTOROLA
74LS32	T.I., NATIONAL, SIGNETICS, MOTOROLA
74LS157	T.I., NATIONAL, SIGNETICS, MOTOROLA
74LS244	T.I., NATIONAL, SIGNETICS, MOTOROLA
74LS373	T.I., NATIONAL, SIGNETICS, MOTOROLA
74LS393	T.I., NATIONAL, SIGNETICS, MOTOROLA
74S51	T.I., NATIONAL, SIGNETICS
74S138	T.I., NATIONAL, SIGNETICS, MOTOROLA

LINEAR AND MISCELLANEOUS CHIPS

	T.I.	NATIONAL	MOTOROLA	TOSHIBA
1377	X	X	MC1377	X
1488	SN75188	LM1488	MC1488	X
1489A	SN75189	LM1489A	MC1489	X
2901	X	LM2901	X	X
347	X	LF347N	LF347N	X
75339	X	X	X	TA75339

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